Consommation et Affaires commerciales Canada
Consumer and Corporate Affairs Canada

Bureau des brevets
Patent Office

Ottawa, Canada
K1A 0C9

(21) (A1) 2,102,750
(22) 1993/11/09
(43) 1994/05/13

Bd. to corresp. to EP 597,360

(51) INTL.CL.[5] C07D-249/12; C07D-401/12; C07D-403/12; C07D-405/12; C07C-255/50; C07F-007/10; C07F-009/547; A01N-043/653; A01N-055/00; A01N-057/08

(19)(CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Substituted Triazolinones

(72) Haas, Wilhelm - Germany (Federal Republic of) ;
Findeisen, Kurt - Germany (Federal Republic of) ;
Linker, Karl-Heinz - Germany (Federal Republic of) ;
Schallner, Otto - Germany (Federal Republic of) ;
König, Klaus - Germany (Federal Republic of) ;
Marhold, Albrecht - Germany (Federal Republic of) ;
Santel, Hans-Joachim - Germany (Federal Republic of) ;
Dollinger, Markus - Germany (Federal Republic of) ;
Wachendorff-Neumann, Ulrike - Germany (Federal Republic of) ;

(71) Bayer Aktiengesellschaft - Germany (Federal Republic of) ;

(30) (DE) P 42 38 125.8 1992/11/12

(57) 29 Claims

Notice: This application is as filed and may therefore contain an incomplete specification.

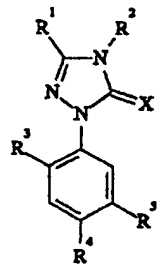
Canada

CCA 3254 (10-92) 41 7530-21-936-3254

Substituted triazolinones

A b s t r a c t

The invention relates to new substituted triazolinones of the general formula (I)



(I)

in which

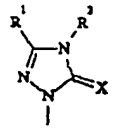
R^1 represents halogenoalkyl,

R^2 represents hydrogen, amino, cyano, alkyl, alkenyl, alkinyl, halogenoalkyl, halogenoalkenyl, halogenoalkinyl, alkoxyalkyl, alkylideneimino, or in each case optionally substituted cycloalkyl or cycloalkylalkyl,

R^3 represents hydrogen or halogen,

R^4 represents cyano or nitro,

R^5 represents nitro, cyano, halogen, heterocyclyloxy, a radical of the formula R^6, $-O-R^6$, $-S-R^6$, $-S(O)-R^6$, $-SO_2-R^6$, $-SO_2-O-R^6$, $-O-SO_2-R^6$, $-C(O)-O-R^6$, $-NR^6R^7$, $-SO_2-NR^6R^7$, $-C(O)-NR^6R^7$, $-NH-P(O)(OR^6)(R^7)$ or $-NH-P(O)(OR^6)(OR^7)$ or a radical of the formula



and

X represents oxygen or sulphur, where

R^6 and R^7 independently of one another in each case represent hydrogen or in each case straight-chain or branched, optionally substituted alkyl, alkenyl, alkinyl, cycloalkyl or aryl,

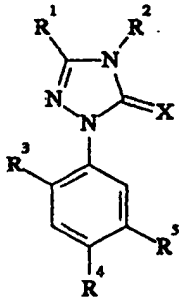
to a plurality of processes for their preparation, and to their use as herbicides, insecticides and acaricides.

The invention relates to new substituted triazolinones, to a plurality of processes for their preparation, and to their use as herbicides, insecticides and acaricides.

It has been disclosed that certain substituted triazolinones such as, for example, the compound 3,4-dimethyl-1-(3-fluoro-4-cyano-phenyl)-1,2,4-triazolin-5-one or the compound 3-methyl-4-propargyl-1-(2,5-difluoro-4-cyano-phenyl)-1,2,4-triazolin-5-one have herbicidal properties (cf., for example, DE 3,839,480).

However, the herbicidal activity of these previously known compounds against problem weeds as well as their compatibility with important crop plants are not entirely satisfactory in all fields of application.

New substituted triazolinones of the general formula (I)



(I)

in which

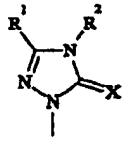
R^1 represents halogenoalkyl,

R^2 represents hydrogen, amino, cyano, alkyl, alkenyl, alkinyl, halogenoalkyl, halogenoalkenyl, halogenoalkinyl, alkoxyalkyl, alkylideneimino, or in each case optionally substituted cycloalkyl or cycloalkylalkyl,

R^3 represents hydrogen or halogen,

R^4 represents cyano or nitro,

R^5 represents nitro, cyano, halogen, heterocyclylalkoxy, a radical of the formula R^6, $-O-R^6$, $-S-R^6$, $-S(O)-R^6$, $-SO_2-R^6$, $-SO_2-O-R^6$, $-O-SO_2-R^6$, $-C(O)-O-R^6$, $-NR^6R^7$, $-SO_2-NR^6R^7$, $-C(O)-NR^6R^7$, $-NH-P(O)(OR^6)(R^7)$ or $-NH-P(O)(OR^6)(OR^7)$ or a radical of the formula



and

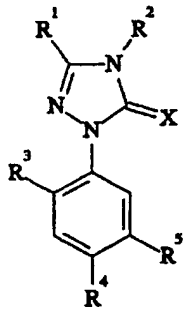
X represents oxygen or sulphur, where

R^6 and R^7 independently of one another in each case represent hydrogen or in each case straight-chain or branched, optionally substituted alkyl, alkenyl, alkinyl, cycloalkyl, cycloalkylalkyl, arylalkyl or aryl,

have now been found.

Where appropriate, the compounds of the formula (I) can exist in the form of geometric and/or optical isomers or isomer mixtures of various compositions, depending on the nature of the substituents. The invention claims the pure isomers and the isomer mixtures.

Furthermore, it has been found that the new substituted triazolinones of the general formula (I)



(I)

in which

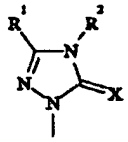
R^1 represents halogenoalkyl,

R^2 represents hydrogen, amino, cyano, alkyl, alkenyl, alkinyl, halogenoalkyl, halogenoalkenyl, halogenoalkinyl, alkoxyalkyl, alkylideneimino, or in each case optionally substituted cycloalkyl or cycloalkylalkyl,

R^3 represents hydrogen or halogen,

R^4 represents cyano or nitro,

R^5 represents nitro, cyano, halogen, heterocyclylalkoxy, a radical of the formula R^6, $-O-R^6$, $-S-R^6$, $-S(O)-R^5$, $-SO_2-R^6$, $-SO_2-O-R^6$, $-O-SO_2-R^6$, $-C(O)-O-R^5$, $-NR^6R^7$, $-SO_2-NR^6R^7$, $-C(O)-NR^6R^7$, $-NH-P(O)(OR^6)(R^7)$ or $-NH-P(O)(OR^6)(OR^7)$ or a radical of the formula



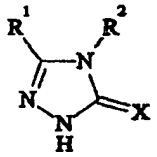
and

X represents oxygen or sulphur, where

R^6 and R^7 independently of one another in each case represent hydrogen or in each case straight-chain or branched, optionally substituted alkyl, alkenyl, alkinyl, cycloalkyl, cycloalkylalkyl, arylalkyl or aryl,

are obtained when

a) 1H-triazolinones of the formula (II)

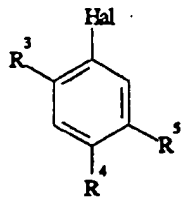


(II)

in which

R^1, R^2 and X have the abovementioned meanings,

are reacted with halogenobenzene derivatives of the formula (III)



(III)

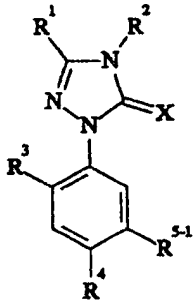
in which

R^3, R^4 and R^5 have the abovementioned meanings and
Hal represents halogen,

if appropriate in the presence of a diluent and if appropriate in the presence of a reaction auxiliary,

or when

b) substituted triazolinones of the formula (Ia)



(Ia)

in which

R^1, R^2, R^3, R^4 and X have the abovementioned meanings and

R^{5-1} represents halogen,

are reacted with nucleophiles of the formula (IV)

$$R^{6-1}\text{-}Z\text{-}H \qquad (IV)$$

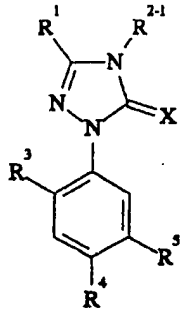
in which

Z represents oxygen or sulphur and

R^{6-1} represents in each case straight-chain or branched, optionally substituted alkyl, alkenyl, alkinyl, cycloalkyl or aryl, and furthermore, in the event that Z represents oxygen, R^{6-1} also represents heterocyclyl,

if appropriate in the presence of a diluent and if appropriate in the presence of a reaction auxiliary, or when

c) substituted triazolinones of the formula (Ib)



(Ib)

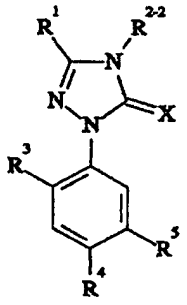
in which

R^1, R^3, R^4, R^5 and X have the abovementioned meanings and

R^{2-1} represents amino,

are reacted with sodium nitrite in the presence of an acid and, if appropriate, in the presence of a diluent, or when

d) substituted triazolinones of the formula (Ic)



(Ic)

in which

R^1, R^3, R^4, R^5 and X have the abovementioned meanings and

R^{2-2} represents hydrogen,

are reacted with alkylating agents of the formula (V)

$$R^{2-3}\text{-}E \qquad (V)$$

in which

R^{2-3} represents alkyl, alkenyl, alkinyl, halogenoalkyl, halogenoalkenyl, halogenoalkinyl, alkoxyalkyl or optionally substituted cycloalkyl and

E represents an electron-attracting leaving group,

if appropriate in the presence of a diluent and if appropriate in the presence of a reaction auxiliary.

Finally, it has been found that the new substituted triazolinones of the general formula (I) have herbicidal, insecticidal and acaricidal properties.

Surprisingly, the substituted triazolinones of the general formula (I) according to the invention have a considerably better herbicidal activity against problem weeds and unexpectedly, at the same time, also a considerably better acaricidal activity compared with the

substituted triazolinones known from the prior art such as, for example, the compound 3,4-dimethyl-1-(3-fluoro-4-cyano-phenyl)-1,2,4-triazolin-5-one or the compound 3-methyl-4-propargyl-1-(2,5-difluoro-4-cyano-phenyl)-1,2,4,triazolin-5-one, which are similar compounds chemically and from the point of view of their action.

Formula (I) provides a general definition of the substituted triazolinones according to the invention. Preferred compounds of the formula (I) are those in which

R^1 represents straight-chain or branched halogenoalkyl having 1 to 6 carbon atoms and 1 to 13 identical or different halogen atoms, in particular fluorine, chlorine, bromine or iodine,

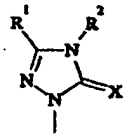
R^2 represents hydrogen, amino, cyano, straight-chain or branched alkyl having 1 to 8 carbon atoms, in each case straight-chain or branched alkenyl or alkinyl, each of which has 2 to 6 carbon atoms, straight-chain or branched halogenoalkyl having 1 to 6 carbon atoms and 1 to 13 identical or different halogen atoms, in particular fluorine, chlorine, bromine or iodine, in each case straight-chain or branched halogenoalkenyl or halogenoalkinyl, each of which has 2 to 6 carbon atoms and 1 to 11 identical or different halogen atoms, in particular fluorine, chlorine, bromine or iodine, straight-chain or branched alkoxyalkyl having 1 to 4 carbon atoms in each of the individual alkyl moieties, straight-chain

or branched alkylideneimino having 1 to 8 carbon atoms, or cycloalkyl or cycloalkylalkyl, each of which has 3 to 8 carbon atoms in the cycloalkyl moiety and, if appropriate, 1 to 4 carbon atoms in the straight-chain or branched alkyl moiety, and each of which is optionally monosubstituted or polysubstituted in the cycloalkyl moiety by identical or different halogen substituents, in particular fluorine, chlorine, bromine and/or iodine,

R^3 represents hydrogen, fluorine, chlorine, bromine or iodine,

R^4 represents cyano or nitro,

R^5 represents nitro, cyano, fluorine, chlorine, bromine, iodine or heterocyclyl $-C_1-C_4$-alkoxy, the heterocyclyl radical being represented by a three- to seven-membered, optionally benzo-fused, saturated or unsaturated heterocycle having 1 to 3 identical or different hetero atoms, in particular nitrogen, oxygen and/or sulphur, or a radical of the formula R^6, $-O-R^6$, $-S-R^6$, $-S(O)-R^6$, $-SO_2-R^6$, $-SO_2-O-R^6$, $-O-SO_2-R^5$, $-C(O)-O-R^6$, $-NR^6R^7$, $-SO_2-NR^6R^7$, $-C(O)-NR^6R^7$, $-NH-P(O)(OR^6)(R^7)$ or $-NH-P(O)(OR^6)(OR^7)$ or a radical of the formula



and

X represents oxygen or sulphur, where

R^6 and R^7 independently of one another in each case represent hydrogen or straight-chain or branched alkyl which has 1 to 8 carbon atoms and which is optionally monosubstituted or polysubstituted by identical or different substituents, suitable substituents being:

halogen, in particular fluorine, chlorine, bromine and/or iodine, cyano, carboxyl, carbamoyl, in each case straight-chain or branched alkoxy, alkoxy-alkoxy, alkylthio, alkylsulphinyl, alkylsulphonyl, alkoxycarbonyl, alkoxycarbonylalkyl, N-alkylamino-carbonyl, cycloalkylaminocarbonyl, N,N-dialkylaminocarbonyl, trialkylsilyl or alkylsulphonylaminocarbonyl, each of which has 1 to 8 carbon atoms in the individual alkyl moieties, or heterocyclyl, the heterocyclyl being represented by a five- to seven-membered, optionally benzo-fused, saturated or unsaturated heterocycle having 1 to 3 identical or different hetero atoms, in particular nitrogen, oxygen and/or sulphur;

R^6 and R^7 furthermore represent alkenyl or alkinyl, each of which has 2 to 8 carbon atoms and each of which is optionally monosubstituted or polysubstituted by identical or different halogen substituents, in particular fluorine, chlorine, bromine and/or iodine;

R^6 and R^7 furthermore represent cycloalkyl which has 3 to 7 carbon atoms and which is optionally monosubstituted or polysubstituted by identical or different halogen substituents, in particular fluorine, chlorine, bromine and/or iodine, and/or by straight-chain or branched alkyl having 1 to 4 carbon atoms, or represent C_3-C_7-cycloalkyl-C_1-C_3-alkyl, or

R^6 and R^7 represent arylalkyl or aryl, each of which has 6 to 10 carbon atoms in the aryl moiety and, if appropriate, 1 to 4 carbon atoms in the straight-chain or branched alkyl moiety, and each of which is optionally monosubstituted or polysubstituted in the aryl moiety by identical or different substituents, suitable aryl substituents in each case being:

halogen, cyano, nitro, in each case straight-chain or branched alkyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl, each of which has 1 to 6 carbon atoms, in each case straight-chain or branched halogenoalkyl, halogenoalkoxy, halogenoalkylthio, halogenoalkylsulphinyl or halogenoalkylsulphonyl, each of which has 1 to 6 carbon atoms and 1 to 13 identical or different halogen atoms, in each case straight-chain or branched alkoxycarbonyl or alkoximinoalkyl, each of which has 1 to 6 carbon atoms in the individual alkyl moieties, and phenyl which is optionally monosubstituted or polysubstituted by identical or different halogen substituents and/or by straight-chain or branched alkyl

or alkoxy, each of which has 1 to 6 carbon atoms, and/or by straight-chain or branched halogenoalkyl or halogenoalkoxy, each of which has 1 to 6 carbon atoms and 1 to 13 identical or different halogen atoms.

Particularly preferred compounds of the formula (I) are those in which

R^1 represents straight-chain or branched halogenoalkyl having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, in particular fluorine, chlorine or bromine,

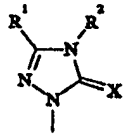
R^2 represents hydrogen, amino, cyano, straight-chain or branched alkyl having 1 to 6 carbon atoms, in each case straight-chain or branched alkenyl or alkinyl, each of which has 2 to 4 carbon atoms, straight-chain or branched halogenoalkyl having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, in particular fluorine, chlorine or bromine, in each case straight-chain or branched halogeno-alkenyl or halogenoalkinyl, each of which has 2 to 4 carbon atoms and 1 to 7 identical or different halogen atoms, in particular fluorine, chlorine or bromine, straight-chain or branched alkoxyalkyl having 1 to 3 carbon atoms in each of the individual alkyl moieties, straight-chain or branched alkyl-ideneimino having 1 to 6 carbon atoms, or cycloalkyl or cycloalkylalkyl, each of which has 3 to 7 carbon

atoms in the cycloalkyl moiety and, if appropriate, 1 to 3 carbon atoms in the straight-chain or branched alkyl moiety, and each of which is optionally monosubstituted to tetrasubstituted in the cycloalkyl moiety by identical or different halogen substituents, in particular fluorine, chlorine and/or bromine,

R^3 represents hydrogen, fluorine, chlorine or bromine,

R^4 represents cyano or nitro,

R^5 represents nitro, cyano, fluorine, chlorine, bromine or heterocyclyl $-C_1-C_3$-alkoxy, the heterocyclyl radical being represented by a four- or six-membered, saturated or unsaturated heterocycle having 1 to 3 identical or different hetero atoms, in particular nitrogen, oxygen and/or sulphur, or a radical of the formula R^6, $-O-R^6$, $-S-R^6$, $-S(O)-R^6$, $-SO_2-R^6$, $-SO_2-O-R^6$, $-O-SO_2-R^6$, $-C(O)-O-R^6$, $-NR^6R^7$, $-SO_2-NR^6R^7$, $-C(O)-NR^6R^7$, $-NH-P(O)(OR^6)(R^7)$ or $-NH-P(O)(OR^6)(OR^7)$ or a radical of the formula



and

X represents oxygen or sulphur, where

R^6 and R^7 independently of one another in each case

represent hydrogen or straight-chain or branched alkyl which has 1 to 6 carbon atoms and which is optionally monosubstituted, suitable substituents being:

cyano, carboxyl, carbamoyl, in each case straight-chain or branched alkoxy, alkoxyalkoxy, alkylthio, alkylsulphinyl, alkylsulphonyl, alkoxycarbonyl, alkoxycarbonylalkyl, N-alkylaminocarbonyl, N,N-dialkylaminocarbonyl, trialkylsilyl or alkylsulphonylaminocarbonyl, each of which has 1 to 6 carbon atoms in the individual alkyl moieties, or heterocyclyl, the heterocyclyl radical being represented by a five- or six-membered, saturated or unsaturated heterocycle having 1 to 3 identical or different hetero atoms, in particular nitrogen, oxygen and/or sulphur;

R^6 and R^7 furthermore represent straight-chain or branched halogenoalkyl having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, in particular fluorine, chlorine or bromine and being optionally further substituted by C_{1-2}alkoxycarbonyl, C_{1-6}cycloalkylaminocarbonyl or cyano,

R^6 and R^7 furthermore represent alkenyl or alkinyl, each of which has 2 to 6 carbon atoms and each of which is optionally monosubstituted to trisubstituted by identical or different halogen substituents, in particular fluorine, chlorine or bromine;

R^6 and R^7 furthermore represent cycloalkyl which has 3 to

6 carbon atoms and which is optionally monosubstituted to tetrasubstituted by identical or different halogen substituents, in particular fluorine, chlorine or bromine, and/or by straight-chain or branched alkyl having 1 to 3 carbon atoms, or represent C_{3-6}-cycloalkyl-C_1-C_2-alkyl, or

represent phenylalkyl or phenyl, the first-mentioned has 1 to 3 carbon atoms in the straight-chain or branched alkyl moiety and each of which is optionally monosubstituted to trisubstituted in the phenyl moiety by identical or different substituents, suitable phenyl substituents in each case being:

halogen, cyano, nitro, in each case straight-chain or branched alkyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl, each of which has 1 to 4 carbon atoms, in each case straight-chain or branched halogenoalkyl, halogenoalkoxy, halogenoalkylthio, halogenoalkylsulphinyl or halogenoalkylsulphonyl, each of which has 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, in each case straight-chain or branched alkoxycarbonyl or alkoximinoalkyl, each of which has 1 to 4 carbon atoms in the individual alkyl moieties, and phenyl which is optionally monosubstituted or polysubstituted by identical or different halogen substituents and/or by straight-chain or branched alkyl or alkoxy, each of which has 1 to 4 carbon atoms, and/or by straight-chain or branched halogenoalkyl or

halogenoalkoxy, each of which has 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms.

Very particularly preferred compounds of the formula (I) are those in which

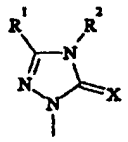
R^1 represents halogenoalkyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, in particular fluorine or chlorine,

R^2 represents hydrogen, amino, cyano, straight-chain or branched alkyl having 1 to 4 carbon atoms, in each case straight-chain or branched alkenyl or alkinyl, each of which has 2 to 3 carbon atoms, halogenoalkyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, in particular fluorine, chlorine or bromine, in each case straight-chain or branched halogenoalkenyl or halogenoalkinyl, each of which has 2 to 3 carbon atoms and 1 to 3 identical or different halogen atoms, in particular fluorine or chlorine, straight-chain or branched alkoxyalkyl having 1 or 2 carbon atoms in each of the individual alkyl moieties, straight-chain or branched alkylideneimino having 1 to 6 carbon atoms, or cyclopropyl, cyclopropylmethyl, cyclohexyl or cyclohexylmethyl, each of which is optionally monosubstituted or disubstituted in the cycloalkyl moiety by identical or different halogen substituents, in particular fluorine or chlorine,

R^3 represents hydrogen, fluorine or chlorine,

R^4 represents cyano or nitro,

R^5 represents nitro, cyano, fluorine, chlorine, bromine or heterocyclylmethoxy, the heterocyclyl radical being represented by a five- or six-membered, saturated or unsaturated heterocycle having 1 to 3 identical or different hetero atoms, in particular nitrogen, oxygen and/or sulphur, or represents a radical of the formula R^6, $-O-R^6$, $-S-R^6$, $-S(O)-R^6$, $-SO_2-R^6$, $-SO_2-O-R^6$, $-O-SO_2-R^6$, $-C(O)-O-R^6$, $-NR^6R^7$, $-SO_2-NR^6R^7$, $-C(O)-NR^6R^7$, $-NH-P(O)(OR^6)(R^7)$ or $-NH-P(O)(OR^6)(OR^7)$ or a radical of the formula



and

X represents oxygen or sulphur, where

R^6 and R^7 independently of one another in each case represent hydrogen or optionally monosubstituted straight-chain or branched alkyl having 1 to 4 carbon atoms, suitable substituents being:

cyano, carboxyl, carbamoyl, in each case straight-chain or branched alkoxy, alkoxyalkoxy, alkylthio, alkylsulphinyl, alkylsulphonyl, alkoxycarbonyl, alkylcarbonylalkyl, N-alkylaminocarbonyl,

N,N-dialkylaminocarbonyl, trialkylsilyl or alkylsulphonylaminocarbonyl, each of which has 1 to 4 carbon atoms in the individual alkyl moieties, or heterocyclyl, the heterocyclyl radical being represented by a five- or six-membered saturated or unsaturated heterocycle having 1 to 3 identical or different hetero atoms, in particular nitrogen, oxygen and/or sulphur;

R^6 and R^7 furthermore represent halogenoalkyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, in particular fluorine or chlorine and being optionally further substituted by methoxycarbonyl, ethoxycarbonyl, cyano or cyclopropylaminocarbonyl;

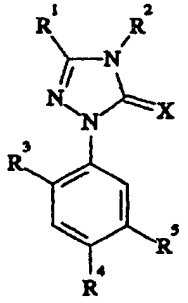
R^6 and R^7 furthermore represent alkenyl or alkinyl, each of which has 2 to 5 carbon atoms and each of which is optionally monosubstituted by halogen, in particular fluorine or chlorine;

R^6 and R^7 furthermore represent cyclopropyl or cyclohexyl, each of which is optionally monosubstituted or disubstituted by identical or different substituents from the series comprising fluorine, chlorine, methyl and/or ethyl, or represent cyclopropylmethyl, cyclopentylmethyl or cyclohexylmethyl, or

R^6 and R^7 represent phenylalkyl or phenyl, the first-mentioned has 1 or 2 carbon atoms in the alkyl moiety and each of which is optionally monosubstituted or disubstituted in the phenyl moiety by identical or different substituents, suitable phenyl substituents in each case being:

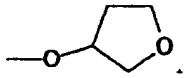
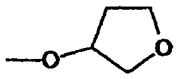
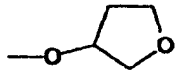
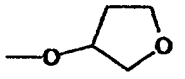
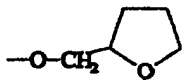
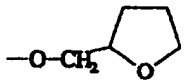
fluorine, chlorine, bromine, cyano, nitro, methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, methoxy, ethoxy, n- or i-propoxy, n-, i-, s- or t-butoxy, methylthio, ethylthio, methylsulphinyl, methylsulphonyl, trifluoromethyl, difluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, trfluoromethylsulphinyl, trifluoromethylsulphonyl, methoxycarbonyl, ethoxycarbonyl, methoximinomethyl, methoximinoethyl, ethoximinomethyl, ethoximinoethyl, or phenyl which is optionally monosubstituted to disubstituted by identical or different substituents from the series comprising fluorine, chlorine, bromine, methyl, ethyl, methoxy, ethoxy, trifluoromethyl and/or trifluoromethoxy.

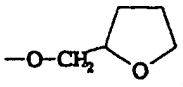
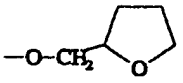
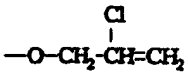
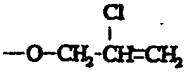
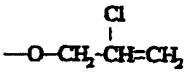
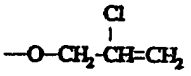
The following substituted triazolinones of the general formula (I) may be mentioned individually in addition to the compounds given in the Preparation Examples:



(I)

R^1	R^2	R^3	R^4	R^5	X
CF_3	CH_3	F	CN	OH	O
CF_3	CH_3	Cl	CN	OH	O
CF_3	CH_3	F	NO_2	OH	O
CF_3	CH_3	Cl	NO_2	OH	O
CF_3	CH_3	Cl	CN	CH_3O	O
CF_3	CH_3	Cl	NO_2	CH_3O	O
CF_3	CH_3	F	NO_2	CH_3O	O
CF_3	CH_3	F	CN	$-O-CH_2-C\equiv CH$	O
CF_3	CH_3	Cl	CN	$-O-CH_2-C\equiv CH$	O
CF_3	CH_3	F	NO_2	$-O-CH_2-C\equiv CH$	O
CF_3	CH_3	Cl	NO_2	$-O-CH_2-C\equiv CH$	O
CF_3	CH_3	F	CN	$-O-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOC_2H_5$	O
CF_3	CH_3	Cl	CN	$-O-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOC_2H_5$	O
CF_3	CH_3	F	NO_2	$-O-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOC_2H_5$	O
CF_3	CH_3	Cl	NO_2	$-O-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOC_2H_5$	O

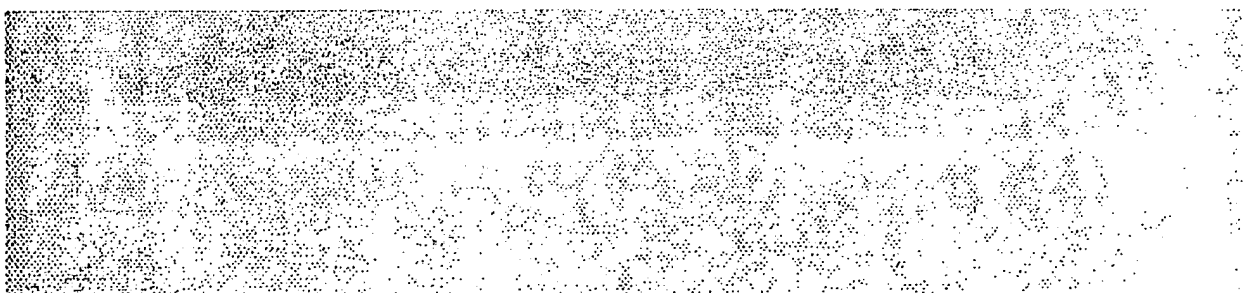
R^1	R^2	R^3	R^4	R^5	X
CF_3	CH_3	F	CN		O
CF_3	CH_3	Cl	CN		O
CF_3	CH_3	F	NO_2		O
CF_3	CH_3	Cl	NO_2		O
CF_3	CH_3	F	CN	$-O-CH_2-CN$	O
CF_3	CH_3	Cl	CN	$-O-CH_2-CN$	O
CF_3	CH_3	F	NO_2	$-O-CH_2-CN$	O
CF_3	CH_3	Cl	NO_2	$-O-CH_2-CN$	O
CF_3	CH_3	F	CN		O
CF_3	CH_3	Cl	CN		O

R^1	R^2	R^3	R^4	R^5	X
CF_3	CH_3	F	NO_2		O
CF_3	CH_3	Cl	NO_2		O
CF_3	CH_3	F	CN		O
CF_3	CH_3	Cl	CN		O
CF_3	CH_3	Cl	NO_2		O
CF_3	CH_3	F	NO_2		O
CF_3	CH_3	F	CN	$-O-SO_2-CH_3$	O
CF_3	CH_3	Cl	CN	$-O-SO_2-CH_3$	O
CF_3	CH_3	F	NO_2	$-O-SO_2-CH_3$	O
CF_3	CH_3	Cl	NO_2	$-O-SO_2-CH_3$	O
CF_3	CH_3	F	CN	$-O-CH_2-COOCH_3$	O

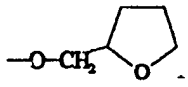
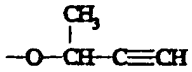
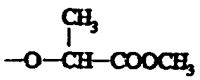
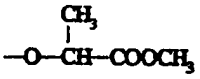
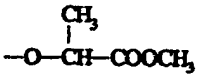
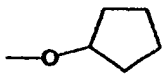
R^1	R^2	R^3	R^4	R^5	X
CF_3	CH_3	Cl	CN	$-O-CH_2-COOCH_3$	O
CF_3	CH_3	F	NO_2	$-O-CH_2-COOCH_3$	O
CF_3	CH_3	Cl	NO_2	$-O-CH_2-COOCH_3$	O
CF_3	CH_3	F	NO_2	F	O
CF_3	CH_3	Cl	NO_2	F	O
CF_3	CH_3	F	NO_2	Cl	O
CF_3	CH_3	Cl	NO_2	Cl	O
CF_3	CH_3	F	CN	$-O-CHF_2$	O
CF_3	CH_3	Cl	CN	$-O-CHF_2$	O
CF_3	CH_3	F	NO_2	$-O-CHF_2$	O
CF_3	CH_3	Cl	NO_2	$-O-CHF_2$	O
CF_3	CH_3	F	CN	$-S-CH_3$	O
CF_3	CH_3	Cl	CN	$-S-CH_3$	O
CF_3	CH_3	F	NO_2	$-S-CH_3$	O
CF_3	CH_3	Cl	NO_2	$-S-CH_3$	O

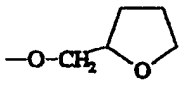
R^1	R^2	R^3	R^4	R^5	X
CF_3	CH_3	F	CN	$-S-C_2H_5$	O
CF_3	CH_3	Cl	CN	$-S-C_2H_5$	O
CF_3	CH_3	F	NO_2	$-S-C_2H_5$	O
CF_3	CH_3	Cl	NO_2	$-S-C_2H_5$	O
CF_3	CH_3	F	CN	$-S-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOC_2H_5$	O
CF_3	CH_3	Cl	CN	$-S-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOC_2H_5$	O
CF_3	CH_3	F	NO_2	$-S-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOC_2H_5$	O
CF_3	CH_3	Cl	NO_2	$-S-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOC_2H_5$	O
CF_3	CH_3	F	CN	$-S-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-C\equiv CH$	O
CF_3	CH_3	Cl	CN	$-S-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-C\equiv CH$	O
CF_3	CH_3	F	NO_2	$-S-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-C\equiv CH$	O
CF_3	CH_3	Cl	NO_2	$-S-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-C\equiv CH$	O

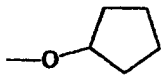
R^1	R^2	R^3	R^4	R^5	X
CF_3	CH_3	Cl	CN	$-S-CH_2-COOCH_3$	O
CF_3	CH_3	F	CN	$-S-CH_2-COOCH_3$	O
CF_3	CH_3	Cl	NO_2	$-S-CH_2-COOCH_3$	O
CF_3	CH_3	F	NO_2	$-S-CH_2-COOCH_3$	O
CF_3	CH_3	F	CN	CH_3	O
CF_3	CH_3	F	CN	$-S(O)-CH_3$	O
CF_3	CH_3	F	CN	$-SO_2-CH_3$	O
CF_3	CH_3	F	CN	$-SO_2-O-CH_3$	O
CF_3	CH_3	F	CN	$-SO_2-NH-CH_3$	O
CF_3	CH_3	F	CN	$-NH-CH_3$	O
CF_3	CH_3	F	CN	$-N(CH_3)_2$	O
CF_3	CH_3	F	CN	$-COOCH_3$	O
CF_3	CH_3	F	CN	$-COOC_2H_5$	O
CF_3	CH_3	Cl	NO_2	$-COOCH_3$	O
CF_3	CH_3	Cl	NO_2	$-COOC_2H_5$	O
CF_3	CH_3	F	CN	$-CO-NH-CH_3$	O
CF_3	CH_3	F	CN	$-CO-N(CH_3)-CH_3$	O

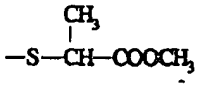
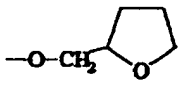
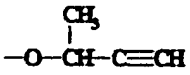
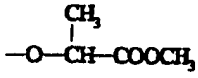
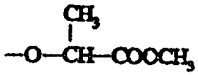
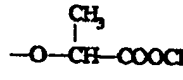
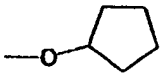


R^1	R^2	R^3	R^4	R^5	X
CF_3	CH_3	F	CN	$-NH-\overset{\overset{O}{\|}}{\underset{\underset{CH_3}{\|}}{P}}-OCH_3$	O
CF_3	CH_3	F	CN	$-NH-\overset{\overset{O}{\|}}{\underset{\underset{OC_2H_5}{\|}}{P}}-OC_2H_5$	O
CF_3	C_2H_5	F	CN	OH	O
CF_3	C_2H_5	F	CN	OCH_3	O
CF_3	C_2H_5	F	CN	$-O-CH_2-CH=CH_2$	O
CF_3	C_2H_5	F	CN	$-O-CH_2-C\equiv CH$	O
CF_3	C_2H_5	F	CN	$-O-\underset{\underset{CH_3}{\|}}{CH}-COOC_2H_5$	O
CF_3	C_2H_5	F	CN	$-O-CH_2-COOCH_3$	O
CF_3	C_2H_5	F	CN	$-S-CH_3$	O
CF_3	C_2H_5	F	CN	$-S-C_2H_5$	O
CF_3	C_2H_5	F	CN	$-S-\underset{\underset{CH_3}{\|}}{CH}-COOCH_3$	O
CF_3	C_2H_5	F	CN	F	O

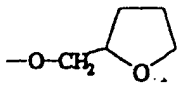
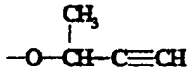
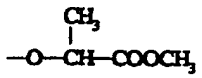
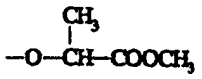
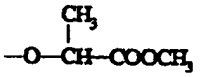
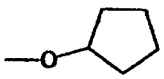
R^1	R^2	R^3	R^4	R^5	X
CF_3	C_2H_5	F	CN		O
CF_3	C_2H_5	F	CN		O
CF_3	C_2H_5	Cl	CN	OCH_3	O
CF_3	C_2H_5	Cl	CN	$-S-C_2H_5$	O
CF_3	C_2H_5	F	NO_2	OCH_3	O
CF_3	C_2H_5	Cl	NO_2	$-O-CH_2-C\equiv CH$	O
CF_3	C_2H_5	Cl	CN		O
CF_3	C_2H_5	F	NO_2		O
CF_3	C_2H_5	Cl	NO_2		O
CF_3	C_2H_5	F	CN		O
CF_3	C_2H_5	F	CN	$-O-CH_2-C_6H_5$	O
CF_3	$-CH_2-CH=CH_2$	F	CN	OH	O
CF_3	$-CH_2-CH=CH_2$	F	CN	OCH_3	O

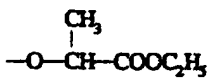
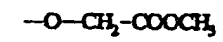
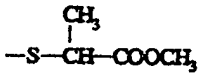
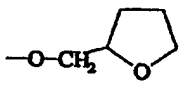
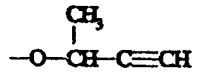
R^1	R^2	R^3	R^4	R^5	X
CF_3	$-CH_2-CH=CH_2$	F	CN	$-O-CH_2-CH=CH_2$	O
CF_3	$-CH_2-CH=CH_2$	F	CN	$-O-CH_2-C\equiv CH$	O
CF_3	$-CH_2-CH=CH_2$	F	CN	$-O-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOC_2H_5$	O
CF_3	$-CH_2-CH=CH_2$	F	CN	$-O-CH_2-COOCH_3$	O
CF_3	$-CH_2-CH=CH_2$	F	CN	$-S-CH_3$	O
CF_3	$-CH_2-CH=CH_2$	F	CN	$-S-C_2H_5$	O
CF_3	$-CH_2-CH=CH_2$	F	CN	$-S-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOCH_3$	O
CF_3	$-CH_2-CH=CH_2$	F	CN	F	O
CF_3	$-CH_2-CH=CH_2$	F	CN		O
CF_3	$-CH_2-CH=CH_2$	F	CN	$-O-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-C\equiv CH$	O
CF_3	$-CH_2-CH=CH_2$	Cl	CN	OCH_3	O
CF_3	$-CH_2-CH=CH_2$	Cl	CN	$-S-C_2H_5$	O
CF_3	$-CH_2-CH=CH_2$	F	NO_2	OCH_3	O
CF_3	$-CH_2-CH=CH_2$	Cl	NO_2	$-O-CH_2-C\equiv CH$	O

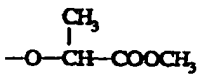
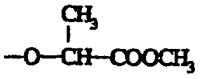
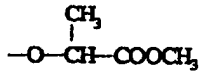
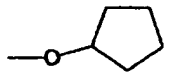
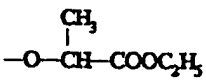
R^1	R^2	R^3	R^4	R^5	X
CF_3	$-CH_2-CH=CH_2$	Cl	CN	$-O-\underset{\displaystyle CH_3}{\overset{}{CH}}-COOCH_3$	O
CF_3	$-CH_2-CH=CH_2$	F	NO_2	$-O-\underset{\displaystyle CH_3}{\overset{}{CH}}-COOCH_3$	O
CF_3	$-CH_2-CH=CH_2$	Cl	NO_2	$-O-\underset{\displaystyle CH_3}{\overset{}{CH}}-COOCH_3$	O
CF_3	$-CH_2-CH=CH_2$	F	CN		O
CF_3	$-CH_2-CH=CH_2$	F	CN	$-O-CH_2-C_6H_5$	O
CF_3	$-CHF_2$	F	CN	OH	O
CF_3	$-CHF_2$	F	CN	OCH_3	O
CF_3	$-CHF_2$	F	CN	$-O-CH_2-CH=CH_2$	O
CF_3	$-CHF_2$	F	CN	$-O-CH_2-C\equiv CH$	O
CF_3	$-CHF_2$	F	CN	$-O-\underset{\displaystyle CH_3}{\overset{}{CH}}-COOC_2H_5$	O
CF_3	$-CHF_2$	F	CN	$-O-CH_2-COOCH_3$	O
CF_3	$-CHF_2$	F	CN	$-S-CH_3$	O
CF_3	$-CHF_2$	F	CN	$-S-C_2H_5$	O

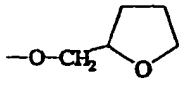
R^1	R^2	R^3	R^4	R^5	X
CF_3	$-CHF_2$	F	CN		O
CF_3	$-CHF_2$	F	CN	F	O
CF_3	$-CHF_2$	F	CN		O
CF_3	$-CHF_2$	F	CN		O
CF_3	$-CHF_2$	Cl	CN	OCH_3	O
CF_3	$-CHF_2$	Cl	CN	$-S-C_2H_5$	O
CF_3	$-CHF_2$	F	NO_2	OCH_3	O
CF_3	$-CHF_2$	Cl	NO_2	$-O-CH_2-C\equiv CH$	O
CF_3	$-CHF_2$	Cl	CN		O
CF_3	$-CHF_2$	F	NO_2		O
CF_3	$-CHF_2$	Cl	NO_2		O
CF_3	$-CHF_2$	F	CN		O

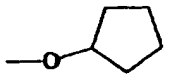
R^1	R^2	R^3	R^4	R^5	X
CF_3	$-CHF_2$	F	CN	$-O-CH_2-C_6H_5$	O
CF_3		F	CN	OH	O
CF_3		F	CN	OCH_3	O
CF_3		F	CN	$-O-CH_2-CH=CH_2$	O
CF_3		F	CN	$-O-CH_2-C\equiv CH$	O
CF_3		F	CN	$-O-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOC_2H_5$	O
CF_3		F	CN	$-O-CH_2-COOCH_3$	O
CF_3		F	CN	$-S-CH_3$	O
CF_3		F	CN	$-S-C_2H_5$	O
CF_3		F	CN	$-S-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOCH_3$	O
CF_3		F	CN	F	O

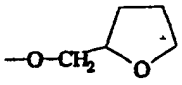
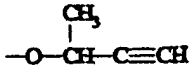
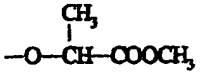
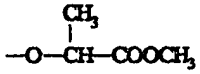
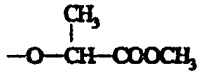
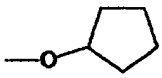
R^1	R^2	R^3	R^4	R^5	X
CF_3		F	CN		O
CF_3		F	CN		O
CF_3		Cl	CN	OCH_3	O
CF_3		Cl	CN	$-S-C_2H_5$	O
CF_3		F	NO_2	OCH_3	O
CF_3		Cl	NO_2	$-O-CH_2-C\equiv CH$	O
CF_3		Cl	CN		O
CF_3		F	NO_2		O
CF_3		Cl	NO_2		O
CF_3		F	CN		O

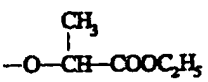
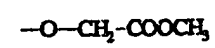
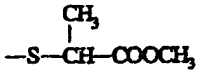
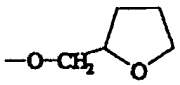
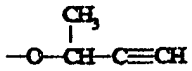
R^1	R^2	R^3	R^4	R^5	X
CF_3		F	CN	$-O-CH_2-C_6H_5$	O
$-CHF_2$	CH_3	F	CN	OH	O
$-CHF_2$	CH_3	F	CN	OCH_3	O
$-CHF_2$	CH_3	F	CN	$-O-CH_2-CH=CH_2$	O
$-CHF_2$	CH_3	F	CN	$-O-CH_2-C\equiv CH$	O
$-CHF_2$	CH_3	F	CN		O
$-CHF_2$	CH_3	F	CN		O
$-CHF_2$	CH_3	F	CN	$-S-CH_3$	O
$-CHF_2$	CH_3	F	CN	$-S-C_2H_5$	O
$-CHF_2$	CH_3	F	CN		O
$-CHF_2$	CH_3	F	CN	F	O
$-CHF_2$	CH_3	F	CN		O
$-CHF_2$	CH_3	F	CN		O

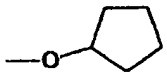
R^1	R^2	R^3	R^4	R^5	X
$-CHF_2$	CH_3	Cl	CN	OCH_3	O
$-CHF_2$	CH_3	Cl	CN	$-S-C_2H_5$	O
$-CHF_2$	CH_3	F	NO_2	OCH_3	O
$-CHF_2$	CH_3	Cl	NO_2	$-O-CH_2-C\equiv CH$	O
$-CHF_2$	CH_3	Cl	CN		O
$-CHF_2$	CH_3	F	NO_2		O
$-CHF_2$	CH_3	Cl	NO_2		O
$-CHF_2$	CH_3	F	CN		O
$-CHF_2$	CH_3	F	CN	$-O-CH_2-C_6H_5$	O
$-CF_2Cl$	CH_3	F	CN	OH	O
$-CF_2Cl$	CH_3	F	CN	OCH_3	O
$-CF_2Cl$	CH_3	F	CN	$-O-CH_2-CH=CH_2$	O
$-CF_2Cl$	CH_3	F	CN	$-O-CH_2-C\equiv CH$	O
$-CF_2Cl$	CH_3	F	CN		O

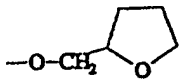
R^1	R^2	R^3	R^4	R^5	X
$-CF_2Cl$	CH_3	F	CN	$-O-CH_2-COOCH_3$	O
$-CF_2Cl$	CH_3	F	CN	$-S-CH_3$	O
$-CF_2Cl$	CH_3	F	CN	$-S-C_2H_5$	O
$-CF_2Cl$	CH_3	F	CN	$-S-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOCH_3$	O
$-CF_2Cl$	CH_3	F	CN	F	O
$-CF_2Cl$	CH_3	F	CN		O
$-CF_2Cl$	CH_3	F	CN	$-O-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-C\equiv CH$	O
$-CF_2Cl$	CH_3	Cl	CN	OCH_3	O
$-CF_2Cl$	CH_3	Cl	CN	$-S-C_2H_5$	O
$-CF_2Cl$	CH_3	F	NO_2	OCH_3	O
$-CF_2Cl$	CH_3	Cl	NO_2	$-O-CH_2-C\equiv CH$	O
$-CF_2Cl$	CH_3	Cl	CN	$-O-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOCH_3$	O

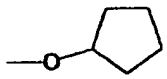
R^1	R^2	R^3	R^4	R^5	X
$-CF_2Cl$	CH_3	F	NO_2	$-O-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOCH_3$	O
$-CF_2Cl$	CH_3	Cl	NO_2	$-O-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOCH_3$	O
$-CF_2Cl$	CH_3	F	CN		O
$-CF_2Cl$	CH_3	F	CN	$-O-CH_2-C_6H_5$	O
$-CCl_3$	CH_3	F	CN	OH	O
$-CCl_3$	CH_3	F	CN	OCH_3	O
$-CCl_3$	CH_3	F	CN	$-O-CH_2-CH=CH_2$	O
$-CCl_3$	CH_3	F	CN	$-O-CH_2-C\equiv CH$	O
$-CCl_3$	CH_3	F	CN	$-O-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOC_2H_5$	O
$-CCl_3$	CH_3	F	CN	$-O-CH_2-COOCH_3$	O
$-CCl_3$	CH_3	F	CN	$-S-CH_3$	O
$-CCl_3$	CH_3	F	CN	$-S-C_2H_5$	O
$-CCl_3$	CH_3	F	CN	$-S-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOCH_3$	O

R^1	R^2	R^3	R^4	R^5	X
$-CCl_3$	CH_3	F	CN	F	O
$-CCl_3$	CH_3	F	CN		O
$-CCl_3$	CH_3	F	CN		O
$-CCl_3$	CH_3	Cl	CN	OCH_3	O
$-CCl_3$	CH_3	Cl	CN	$-S-C_2H_5$	O
$-CCl_3$	CH_3	F	NO_2	OCH_3	O
$-CCl_3$	CH_3	Cl	NO_2	$-O-CH_2-C\equiv CH$	O
$-CCl_3$	CH_3	Cl	CN		O
$-CCl_3$	CH_3	F	NO_2		O
$-CCl_3$	CH_3	Cl	NO_2		O
$-CCl_3$	CH_3	F	CN		O
$-CCl_3$	CH_3	F	CN	$-O-CH_2-C_6H_5$	O
CF_3	CH_3	F	CN	OH	S

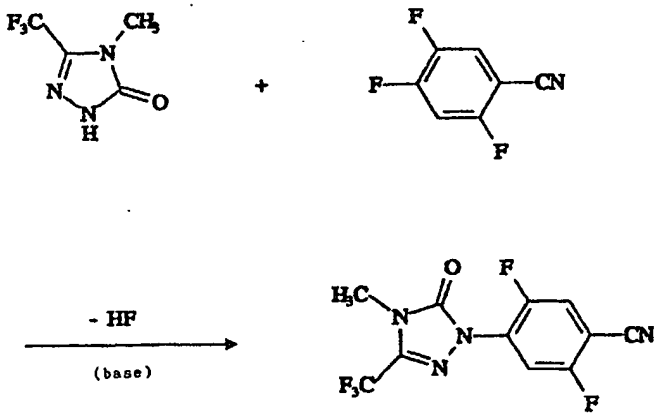
R^1	R^2	R^3	R^4	R^5	X
CF_3	CH_3	F	CN	-O-i-C_3H_7	S
CF_3	CH_3	F	CN	-O-CH_2-CH=CH_2	S
CF_3	CH_3	F	CN	-O-CH_2-C≡CH	S
CF_3	CH_3	F	CN		S
CF_3	CH_3	F	CN		S
CF_3	CH_3	F	CN	-S-CH_3	S
CF_3	CH_3	F	CN	-S-C_2H_5	S
CF_3	CH_3	F	CN		S
CF_3	CH_3	F	CN	F	S
CF_3	CH_3	F	CN		S
CF_3	CH_3	F	CN		S
CF_3	CH_3	Cl	CN	OCH_3	S
CF_3	CH_3	Cl	CN	-S-C_2H_5	S
CF_3	CH_3	F	NO_2	OCH_3	S

R^1	R^2	R^3	R^4	R^5	X
CF_3	CH_3	Cl	NO_2	$-O-CH_2-C\equiv CH$	S
CF_3	CH_3	Cl	CN	$-O-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOCH_3$	S
CF_3	CH_3	F	NO_2	$-O-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOCH_3$	S
CF_3	CH_3	Cl	NO_2	$-O-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOCH_3$	S
CF_3	CH_3	F	CN		S
CF_3	CH_3	F	CN	$-O-CH_2-C_6H_5$	S
CF_3	$-CHF_2$	F	CN	OH	S
CF_3	$-CHF_2$	F	CN	OCH_3	S
CF_3	$-CHF_2$	F	CN	$-O-CH_2-CH=CH_2$	S
CF_3	$-CHF_2$	F	CN	$-O-CH_2-C\equiv CH$	S
CF_3	$-CHF_2$	F	CN	$-O-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOC_2H_5$	S

R^1	R^2	R^3	R^4	R^5	X
CF_3	$-CHF_2$	F	CN	$-O-CH_2-COOCH_3$	S
CF_3	$-CHF_2$	F	CN	$-S-CH_3$	S
CF_3	$-CHF_2$	F	CN	$-S-C_2H_5$	S
CF_3	$-CHF_2$	F	CN	$-S-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOCH_3$	S
CF_3	$-CHF_2$	F	CN	F	S
CF_3	$-CHF_2$	F	CN		S
CF_3	$-CHF_2$	F	CN	$-O-\underset{\displaystyle CH_3}{\underset{|}{CH}}-C\equiv CH$	S
CF_3	$-CHF_2$	Cl	CN	OCH_3	S
CF_3	$-CHF_2$	Cl	CN	$-S-C_2H_5$	S
CF_3	$-CHF_2$	F	NO_2	OCH_3	S
CF_3	$-CHF_2$	Cl	NO_2	$-O-CH_2-C\equiv CH$	S
CF_3	$-CHF_2$	Cl	CN	$-O-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOCH_3$	S

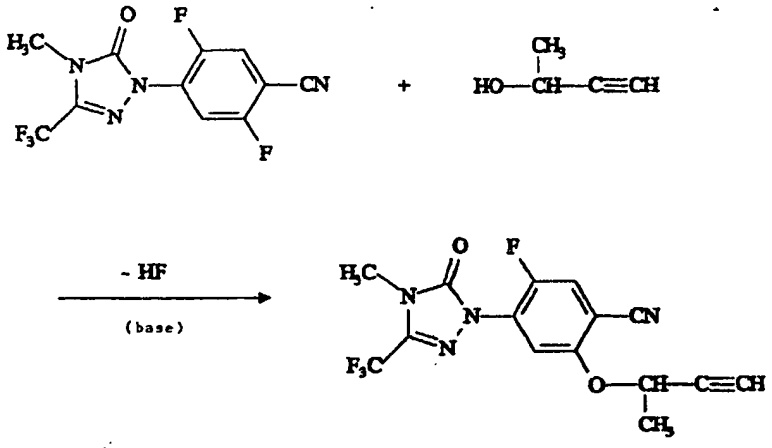
R^1	R^2	R^3	R^4	R^5	X
CF_3	$-CHF_2$	F	NO_2	$-O-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOCH_3$	S
CF_3	$-CHF_2$	Cl	NO_2	$-O-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-COOCH_3$	S
CF_3	$-CHF_2$	F	CN		S
CF_3	$-CHF_2$	F	CN	$-O-CH_2-C_6H_5$	S

If, for example, 4-methyl-3-trifluoromethyl-1,2,4-triazolin-5-one and 2,4,5-trifluorobenzonitrile are used as starting materials, the course of the reaction of process (a) according to the invention can be represented by the following equation:

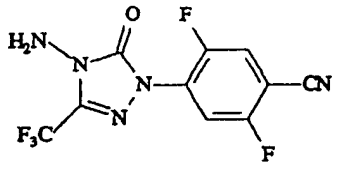


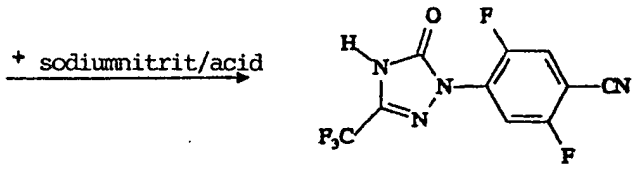
If, for example, 1-(4-cyano-2,5-difluorophenyl)-4-methyl-

3-trifluoromethyl-1,2,4-triazolin-5-one and 3-butin-2-ol are used as starting materials, the course of the reaction of process (b) according to the invention can be represented by the following equation:

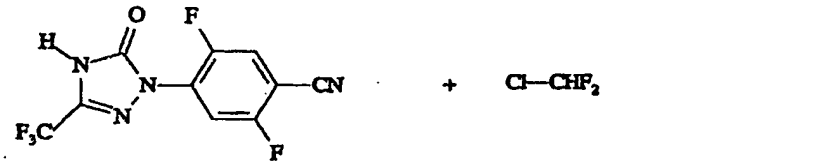


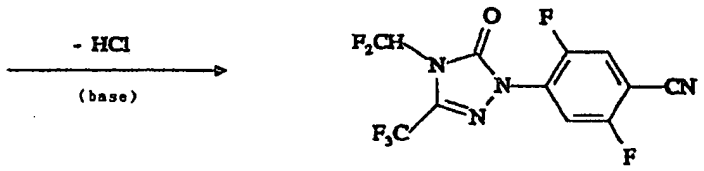
If, for example, 1-(4-cyano-2,5-difluorophenyl)-4-amino-3-trifluoromethyl-1,2,4-triazolin-5-one and sodium nitrite are used as starting materials, the course of the reaction of process (c) according to the invention can be represented by the following equation:





If, for example, 1-(4-cyano-2,5-difluorophenyl)-3-trifluoromethyl-(4H)-1,2,4-triazolin-5-one and chlorodifluoromethane are used as starting materials, the course of the reaction of process (d) according to the invention can be represented by the following equation:





Formula (II) provides a general definition of the 1H-triazolinones required as starting materials for carrying out process (a) according to the invention. In this formula (II), R^1, R^2 and X preferably and particularly preferably represent those radicals which have already been mentioned in connection with the description of the compounds of the formula (I) according to the invention as being preferred and particularly preferred for these substituents.

The 1H-triazolinones of the formula (II) are known or can be obtained analogously to known processes (compare, for example, EP 399,294; US 4,477,459; DE 2,716,707; US 3,780,052; J. Med. Chem. 14, 335-338 [1971]; DE 2,029,375). The compound 4-amino-3-trifluoromethyl-1H-1,2,4-triazolin-5-one was hitherto unknown and is also a subject of the invention. It is obtained when hydrazine hydrate is reacted first with diphenyl carbonate and subsequently with trifluoroacetic acid at temperatures between -20°C and +200°C (compare in this context also the preparation examples).

Formula (III) provides a general definition of the halogenobenzene derivatives furthermore required as starting materials for carrying out process (a) according to the invention. In this formula (III), R^3, R^4 and R^5 preferably and particularly preferably represent those radicals which have already been mentioned in connection with the description of the compounds of the formula (I) according to the invention as being preferred and

particularly preferred for these substituents. Hal preferably represents fluorine, chlorine or bromine, in particular fluorine or chlorine.

The halogenobenzene derivatives of the formula (III) have been disclosed or can be obtained in analogy to known processes (compare, for example, EP 191,181; EP 441,004; EP 431,373). The compound 5-chloro-2,4-difluorobenzonitrile was hitherto unknown and is also a subject of the invention. It is obtained when the known compound 2,4,5-trichlorobenzonitrile (compare, for example, EP 441,004) is reacted with potassium fluoride, if appropriate in the presence of a diluent such as, for example, tetramethylene sulphone, at temperatures between 100°C and 200°C (compare in this context also the Preparation Examples).

Formula (Ia) provides a general definition of the substituted triazolinones required as educts for carrying out process (b) according to the invention. In this formula (Ia), R^1, R^2, R^3, R^4 and X preferably and particularly preferably represent those radicals which have already been mentioned in connection with the description of the substances of the formula (I) according to the invention as being preferred and particularly preferred for these substituents. R^{5-1} preferably represents fluorine, chlorine or bromine, in particular fluorine or chlorine.

The substituted triazolinones of the formula (Ia) are

compounds according to the invention and can be obtained with the aid of processes (a), (c) and/or (d) according to the invention.

Formula (IV) provides a general definition of the nucleophiles furthermore required as educts for carrying out process (b) according to the invention. In this formula (IV), Z preferably represents oxygen or sulphur. R^{6-1} preferably and particularly preferably represents those radicals which have already been mentioned in connection with the description of the substances of the formula (I) according to the invention as being preferred and particularly preferred for the substituent R^6 with the exception of the hydrogen radical. In the event that Z represents oxygen, R^{6-1} furthermore also preferably represents heterocyclyl, with a five- to seven-membered, optionally benzo-fused, saturated or unsaturated heterocycle having 1 to 3 identical or different hetero atoms, in particular nitrogen, oxygen and/or sulphur, preferably being mentioned as heterocyclyl radical.

The nucleophiles of the formula (IV) are generally known compounds of organic chemistry.

Formula (Ib) provides a general definition of the substituted triazolinones required as educts for carrying out process (c) according to the invention. In this formula (Ib), R^1, R^3, R^4, R^5 and X preferably and particularly preferably represent those radicals which have already been mentioned in connection with the description

of the substances of the formula (I) according to the invention as being preferred and particularly preferred for these substituents. R^{2-1} preferably represents amino.

The substituted triazolinones of the formula (Ib) are compounds according to the invention and can be obtained with the aid of processes (a), (b) and/or (d) according to the invention.

Formula (Ic) provides a general definition of the substituted triazolinones required as educts for carrying out process (d) according to the invention. In this formula (Ic), R^1, R^3, R^4, R^5 and X preferably and particularly preferably represent those radicals which have already been mentioned in connection with the description of the substances of the formula (I) according to the invention as being preferred and particularly preferred for these substituents. R^{2-2} preferably represents hydrogen.

The substituted triazolinones of the formula (Ic) are compounds according to the invention and can be obtained with the aid of processes (a), (b) and/or (c) according to the invention.

Formula (V) provides a general definition of the alkylating agents furthermore required as educts for carrying out process (d) according to the invention. In this formula (V), R^{2-3} preferably and particularly preferably represents those radicals which have already been

mentioned in connection with the description of the substances of the formula (I) according to the invention as being preferred and particularly preferred for the substituent R^2, with the exception of the radicals hydrogen, amino, cyano and alkylideneimino. E preferably represents a leaving radical which is customary in alkylating agents such as, for example, halogen, in particular chlorine, bromine or iodine, or in each case optionally substituted alkylsulphonyloxy, alkoxysulphonyloxy or arylsulphonyloxy such as, in particular, methanesulphonyloxy, trifluoromethanesulphonyloxy, methoxysulphonyloxy, ethoxysulphonyloxy or p-toluenesulphonyloxy.

The alkylating agents of the formula (V) are generally known compounds of organic chemistry.

Suitable diluents for carrying out process (a) according to the invention are inert organic solvents. These include, in particular, aliphatic, alicyclic or aromatic, optionally halogenated hydrocarbons such as, for example, benzine, benzene, toluene, xylene, chlorobenzene, dichlorobenzene, petroleum ether, hexane, cyclohexane, dichloromethane, chloroform or carbon tetrachloride; ethers such as diethyl ether, diisopropyl ether, dioxane, tetrahydrofuran or ethylene glycol dimethyl ether or ethylene glycol diethyl ether; ketones such as acetone, butanone or methyl-isobutyl-ketone; nitriles such as acetonitrile, propionitrile or benzonitrile; amides such as N,N-dimethylformamide, N,N-dimethylacetamide,

N-methylformanilide, N-methylpyrrolidone or hexamethylphosphoric triamide, or esters such as methyl acetate or ethyl acetate.

Process (a) according to the invention is preferably carried out in the presence of a suitable reaction auxiliary. Possible reaction auxiliaries are all customary inorganic or organic bases. These preferably include alkaline earth metal hydroxides or alkali metal hydroxides such as sodium hydroxide, calcium hydroxide, potassium hydroxide or else ammonium hydroxide, alkali metal carbonates such as sodium carbonate, potassium carbonate, potassium hydrogencarbonate, sodium hydrogencarbonate or ammonium carbonate, alkali metal acetates or alkaline earth metal acetates such as sodium acetate, potassium acetate, calcium acetate or ammonium acetate, and also tertiary amines such as trimethylamine, triethylamine, tributylamine, N,N-dimethylaniline, pyridine, piperidine, N-methylpiperidine, N,N-dimethylaminopyridine, diazabicyclooctane (DABCO), diazabicyclononene (DBN) or diazabicycloundecene (DBU).

When carrying out process (a) according to the invention, the reaction temperatures can be varied within a substantial range. In general, the process is carried out at temperatures between 0°C and +180°C, preferably at temperatures between +20°C and +120°C.

Process (a) according to the invention is conventionally carried out under atmospheric pressure. However, it is

also possible to carry out the process under elevated or reduced pressure.

To carry out process (a) according to the invention, 1.0 to 3.0 mol, preferably 1.0 to 1.5 mol, of halogenobenzene derivative of the formula (III) and, if appropriate, 1.0 to 3.0 mol, preferably 1.0 to 1.5 mol, of base as reaction auxiliary are generally employed per mole of 1H-triazolinone of the formula (II). The reaction is carried out and the reaction products are worked up and isolated by known methods (compare in this context also the preparation examples).

Possible diluents for carrying out process (b) according to the invention are inert organic solvents. Preferably used solvents are those which have been listed in the description of process (a) according to the invention.

Process (b) according to the invention is preferably carried out in the presence of a suitable reaction auxiliary. Possible reaction auxiliaries are all customary inorganic or organic bases. These include, for example, the hydrides, hydroxides, amides, alcoholates, acetates, carbonates or hydrogencarbonates of alkaline earth metals or alkali metals such as, for example, sodium hydride, sodium amide, sodium methylate, sodium ethylate, potassium tert.-butylate, sodium hydroxide, potassium hydroxide, ammonium hydroxide, sodium acetate, potassium acetate, calcium acetate, ammonium acetate, sodium carbonate, potassium carbonate, potassium

hydrogencarbonate, sodium hydrogencarbonate or ammonium carbonate, and also tertiary amines such as trimethylamine, triethylamine, tributylamine, N,N-dimethylaniline, pyridine, N-methylpiperidine, N,N-dimethylaminopyridine, diazabicyclooctane (DABCO), diazabicyclononene (DNB) or diazabicycloundecene (DBU).

When carrying out process (b) according to the invention, the reaction temperatures can be varied within a substantial range. In general, the process is carried out at temperatures between -20°C and +150°C, preferably at temperatures between 0°C and +120°C.

Process (b) according to the invention is conventionally carried out under atmospheric pressure. However, it is also possible to carry out the process under elevated or reduced pressure.

To carry out process (b) according to the invention, 1.0 to 3.0 mol, preferably 1.0 to 1.5 mol, of nucleophile of the formula (IV) and, if appropriate, 0.1 to 3.0 mol, preferably 1.0 to 1.5 mol, of base as reaction auxiliary are generally employed per mole of substituted triazolinone of the formula (Ia).

The reaction is carried out and the reaction products are worked up and isolated by known methods (compare in this context also the preparation examples).

Process (c) according to the invention is conventionally

carried out in the presence of a suitable acid. Possible acids are, in particular, aqueous mineral acids. Dilute hydrochloric acid is particularly preferably used.

Suitable diluents for carrying out process (c) according to the invention are all diluents which are customary for such diazotisation reactions. It is particularly preferred to use a suitable excess of the aqueous mineral acids which have been employed as reagents, such as, for example, hydrochloric acid, simultaneously as the diluent.

When carrying out process (c) according to the invention, the reaction temperatures can be varied within a substantial range. In general, the process is carried out at temperatures between -20°C and +100°C, preferably at temperatures between -10°C and +80°C.

Process (c) according to the invention is conventionally carried out under atmospheric pressure. However, it is also possible to carry out the process under elevated or reduced pressure.

To carry out process (c) according to the invention, 1.0 to 3.0 mol, preferably 1.0 to 2.0 mol, of sodium nitrite and 1.0 to 10.0 mol, preferably 1.0 to 5.0 mol, of acid are generally employed per mole of substituted triazolinone of the formula (Ib).

The reaction is carried out and the reaction products are

worked up and isolated by known methods (compare in this context also the preparation examples).

Possible diluents for carrying out process (d) according to the invention are inert organic solvents. These include, in particular, aliphatic, alicyclic or aromatic, optionally halogenated hydrocarbons such as, for example, benzine, benzene, toluene, xylene, chlorobenzene, dichlorobenzene, petroleum ether, hexane, cyclohexane, dichloromethane, chloroform, carbon tetrachloride; ethers such as diethyl ether, diisopropyl ether, dioxane, tetrahydrofuran or ethylene glycol dimethyl ether or ethylene glycol diethyl ether; ketones such as acetone, butanone or methyl isobutyl ketone; nitriles such as acetonitrile, propionitrile or benzonitrile; amides such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylformanilide, N-methylpyrrolidone or hexamethylphosphoric triamide; esters such as methyl acetate or ethyl acetate, or sulphoxides such as dimethyl sulphoxide.

If appropriate, process (d) according to the invention can also be carried out in a two-phase system such as, for example, water/toluene or water/dichloromethane, if appropriate in the presence of a suitable phase transfer catalyst. Examples of such catalysts which may be mentioned are: tetrabutylammonium iodide, tetrabutylammonium bromide, tetrabutylammonium chloride, tributyl-methylphosphonium bromide, trimethyl-C_{13}/C_{15}-alkylammonium chloride, trimethyl-C_{13}/C_{15}-alkylammonium bromide,

dibenzyl-dimethyl-ammoniummethylsulphate, dimethyl-C_{12}/C_{14}-alkyl-benzylammonium chloride, dimethyl-C_{12}/C_{14}-alkyl-benzylammonium bromide, tetrabutylammonium hydroxide, triethylbenzylammonium chloride, methyltrioctylammonium chloride, trimethylbenzylammonium chloride, 15-crown-5, 18-crown-6 or tris-[2-(2-methoxyethoxy)-ethyl]-amine.

Process (d) according to the invention is preferably carried out in the presence of a suitable reaction auxiliary. Suitable reaction auxiliaries are all customary inorganic or organic bases. These include, for example, the hydrides, hydroxides, amides, alcoholates, acetates, carbonates or hydrogencarbonates of alkaline earth metals or alkali metals such as, for example, sodium hydride, sodium amide, sodium methylate, sodium ethylate, potassium tert.-butylate, sodium hydroxide, potassium hydroxide, ammonium hydroxide, sodium acetate, potassium acetate, calcium acetate, ammonium acetate, sodium carbonate, potassium carbonate, potassium hydrogencarbonate, sodium hydrogencarbonate or ammonium carbonate, and also tertiary amines such as trimethylamine, triethylamine, tributylamine, N,N-dimethylaniline, pyridine, N-methylpiperidine, N,N-dimethylaminopyridine, diazabicyclooctane (DABCO), diazabicyclononene (DBN) or diazabicycloundecene (DBU).

When carrying out process (d) according to the invention, the reaction temperatures can be varied within a substantial range. In general, the process is carried out at temperatures between -20°C and +150°C, preferably at

temperatures between 0°C and +120°C.

Process (d) according to the invention is conventionally carried out under atmospheric pressure. However, it is also possible to carry out the process under elevated or reduced pressure.

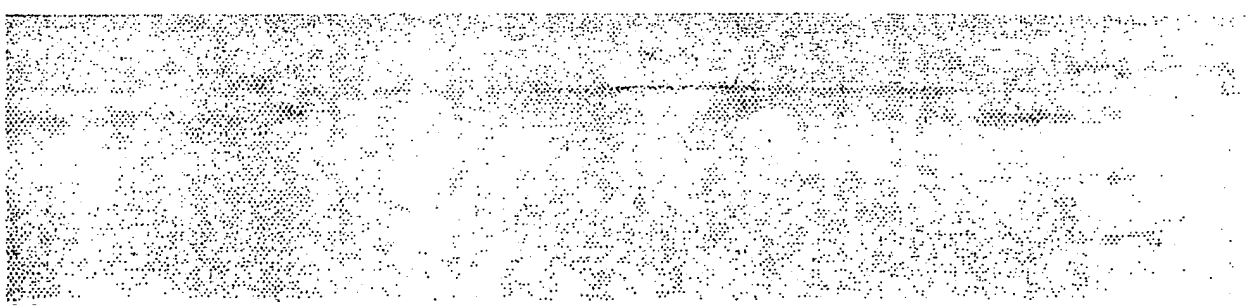
To carry out process (d) according to the invention, 1.0 to 3.0 mol, preferably 1.0 to 2.0 mol, of alkylating agent of the formula (V) and, if appropriate, 1.0 to 3.0 mol, preferably 1.0 to 2.0 mol, of base as reaction auxiliary are generally employed per mole of substituted triazolinone of the formula (Ic).

The reaction is carried out and the reaction products are worked up and isolated by known methods (compare in this context also the preparation examples).

The end products of the formula (I) are purified with the aid of conventional methods, for example by column chromatography or by recrystallisation.

They are characterised with the aid of the melting point or, in the case of compounds which do not crystallise, with the aid of proton nuclear resonance spectroscopy (^{1}H NMR).

The active compounds according to the invention can be used as defoliants, desiccants, agents for destroying broad-leaved plants and, especially, as weed-killers. By



weeds, in the broadest sense, there are to be understood all plants which grow in locations where they are undesired. Whether the substances according to the invention act as total or selective herbicides depends essentially on the amount used.

The active compounds according to the invention can be used, for example, in connection with the following plants:

Dicotyledon weeds of the genera: Sinapis, Lepidium, Galium, Stellaria, Matricaria, Anthemis, Galinsoga, Chenopodium, Urtica, Senecio, Amaranthus, Portulaca, Xanthium, Convolvulus, Ipomoea, Polygonum, Sesbania, Ambrosia, Cirsium, Carduus, Sonchus, Solanum, Rorippa, Rotala, Lindernia, Lamium, Veronica, Abutilon, Emex, Datura, Viola, Galeopsis, Papaver, Centaurea, Trifolium, Ranunculus and Taraxacum.

Dicotyledon cultures of the genera: Gossypium, Glycine, Beta, Daucus, Phaseolus, Pisum, Solanum, Linum, Ipomoea, Vicia, Nicotiana, Lycopersicon, Arachis, Brassica, Lactuca, Cucumis and Cucurbita.

Monocotyledon weeds of the genera: Echinochloa, Setaria, Panicum, Digitaria, Phleum, Poa, Festuca, Eleusine, Brachiaria, Lolium, Bromus, Avena, Cyperus, Sorg hum, Agropyron, Cynodon, Monochoria, Fimbristylis, Sagittaria, Eleocharis, Scirpus, Paspalum, Ischaemum, Sphenoclea, Dactyloctenium, Agrostis, Alopecurus and Apera.

Monocotyledon cultures of the genera: Oryza, Zea, Triticum, Hordeum, Avena, Secale, Sorghum, Panicum, Saccharum, Ananas, Asparagus and Allium.

However, the use of the active compounds according to the invention is in no way restricted to these genera, but also extends in the same manner to other plants.

The compounds are suitable, depending on the concentration, for the total combating of weeds, for example on industrial terrain and rail tracks, and on paths and squares with or without tree plantings. Equally, the compounds can be employed for combating weeds in perennial cultures, for example afforestations, decorative tree plantings, orchards, vineyards, citrus groves, nut orchards, banana plantations, coffee plantations, tea plantations, rubber plantations, oil palm plantations, cocoa plantations, soft fruit plantings and hopfields, and for the selective combating of weeds in annual cultures.

The active compounds according to the invention can also be used particularly successfully for combating mono- and dicotyledon weeds.

The active compounds are furthermore suitable for combating animal pests, preferably arthropods and nematodes, in particular insects and arachnids, encountered in agriculture, in forestry, in the protection of stored products and of materials, and in the hygiene field. They

are active against normally sensitive and resistant species and against all or some stages of development.

The abovementioned pests include:

From the order of the Isopoda, for example, Oniscus asellus, Armadillidium vulgare and Porcellio scaber;
from the order of the Diplopoda, for example, Blaniulus guttulatus;
from the order of the Chilopoda, for example, Geophilus carpophagus and Scutigera spec.;
from the order of the Symphyla, for example, Scutigerella immaculata;
from the order of the Thysanura, for example, Lepisma saccharina;
from the order of the Collembola, for example, Onychiurus armatus;
from the order of the Orthoptera, for example, Blatta orientalis, Periplaneta americana, Leucophaea maderae, Blattella germanica, Acheta domesticus, Gryllotalpa spp., Locusta migratoria migratorioides, Melanoplus differentialis and Schistocerca gregaria;
from the order of the Dermaptera, for example, Forficula auricularia;
from the order of the Isoptera, for example, Reticulitermes spp.;
from the order of the Anoplura, for example, Phylloxera vastatrix, Pemphigus spp., Pediculus humanus corporis, Haematopinus spp. and Linognathus spp.;
from the order of the Mallophaga, for example,

Trichodectes spp. and Damalinea spp.;
from the order of the Thysanoptera, for example, Hercinothrips femoralis and Thrips tabaci;
from the order of the Heteroptera, for example, Eurigaster spp., Dysdercus intermedius, Piesma quadrata, Cimex lectularius, Rhodnius prolixus and Triatoma spp.;
from the order of the Homoptera, for example, Aleurodes brassicae, Bemisia tabaci, Trialeurodes vaporariorum, Aphis gossypii, Brevicoryne brassicae, Cryptomyzus ribis, Doralis fabae, Doralis pomi, Eriosoma lanigerum, Hyalopterus arundinis, Macrosiphum avenae, Myzus spp., Phorodon humuli, Rhopalosiphum padi, Empoasca spp., Euscelis bilobatus, Nephotettix cincticeps, Lecanium corni, Saissetia oleae, Laodelphax striatellus, Nilaparvata lugens, Aonidiella aurantii, Aspidiotus hederae, Pseudococcus spp. and Psylla spp.;
from the order of the Lepidoptera, for example, Pectinophora gossypiella, Bupalus piniarius, Cheimatobia brumata, Lithocolletis blancardella, Hyponomeuta padella, Plutella maculipennis, Malacosoma neustria, Euproctis chrysorrhoea, Lymantria spp., Bucculatrix thurberiella, Phyllocnistis citrella, Agrotis spp., Euxoa spp., Feltia spp., Earias insulana, Heliothis spp., Laphygma exigua, Mamestra brassicae, Panolis flammea, Prodenia litura, Spodoptera spp., Trichoplusia ni, Carpocapsa pomonella, Pieris spp., Chilo spp., Pyrausta nubilalis, Ephestia kuehniella, Galleria mellonella, Tineola bisselliella, Tinea pellionella, Hofmannophila pseudospretella, Cacoecia podana, Capua reticulana, Choristoneura fumiferana, Clysia ambiguella, Homona magnanima and

Tortrix viridana;
from the order of the Coleoptera, for example, Anobium punctatum, Rhizopertha dominica, Bruchidius obtectus, Acanthoscelides obtectus, Hylotrupes bajulus, Agelastica alni, Leptinotarsa decemlineata, Phaedon cochleariae, Diabrotica spp., Psylliodes chrysocephala, Epilachna varivestis, Atomaria spp., Oryzaephilus surinamensis, Anthonomus spp., Sitophilus spp., Otiorrhynchus sulcatus, Cosmopolites sordidus, Ceuthorrhynchus assimilis, Hypera postica, Dermestes spp., Trogoderma spp., Anthrenus spp., Attagenus spp., Lyctus spp., Meligethes aeneus, Ptinus spp., Niptus hololeucus, Gibbium psylloides, Tribolium spp., Tenebrio molitor, Agriotes spp., Conoderus spp., Melolontha melolontha, Amphimallon solstitialis and Costelytra zealandica;
from the order of the Hymenoptera, for example, Diprion spp., Hoplocampa spp., Lasius spp., Monomorium pharaonis and Vespa spp.;
from the order of the Diptera, for example, Aedes spp., Anopheles spp., Culex spp., Drosophila melanogaster, Musca spp., Fannia spp., Calliphora erythrocephala, Lucilia spp., Chrysomyia spp., Cuterebra spp., Gastrophilus spp., Hyppobosca spp., Stomoxys spp., Oestrus spp., Hypoderma spp., Tabanus spp., Tannia spp., Bibio hortulanus, Oscinella frit, Phorbia spp., Pegomyia hyoscyami, Ceratitis capitata, Dacus oleae and Tipula paludosa;
from the order of the Siphonaptera, for example, Xenopsylla cheopis and Ceratophyllus spp.;
from the order of the Arachnida, for example, Scorpio

maurus and Latrodectus mactans;
from the order of the Acarina, for example, Acarus siro, Argas spp., Ornithodoros spp., Dermanyssus gallinae, Eriophyes ribis, Phyllocoptruta oleivora, Boophilus spp., Rhipicephalus spp., Amblyomma spp., Hyalomma spp., Ixodes spp., Psoroptes spp., Chorioptes spp., Sarcoptes spp., Tarsonemus spp., Bryobia praetiosa, Panonychus spp. and Tetranychus spp..

The active compounds according to the invention are distinguished by a powerful insecticidal and acaricidal activity. They can be used particularly successfully for combating the greenhouse red spider mite (Tetranychus urticae). Besides, the active compounds have, in particular, leaf-acting insecticidal properties.

Depending on their particular physical and/or chemical properties, the active compounds can be converted to the customary formulations, such as solutions, emulsions, suspensions, powders, foams, pastes, granules, aerosols, natural and synthetic materials impregnated with active compound, very fine capsules in polymeric substances and in coating compositions for seed, furthermore in formulations used with burning equipment, such as fumigating cartridges, fumigating cans, fumigating coils and the like, as well as ULV cold mist and warm mist formulations.

These formulations are produced in a known manner, for example by mixing the active compounds with extenders,

that is, liquid solvents, liquefied gases under pressure, and/or solid carriers, optionally with the use of surface-active agents, that is emulsifying agents and/or dispersing agents and/or foam-forming agents. In the case of the use of water as an extender, organic solvents can, for example, also be used as auxiliary solvents. As liquid solvents, there are suitable in the main: aromatics, such as xylene, toluene or alkylnaphthalenes, chlorinated aromatics or chlorinated aliphatic hydrocarbons, such as chlorobenzenes, chloroethylenes or methylene chloride, aliphatic hydrocarbons, such as cyclohexane or paraffins, for example mineral oil fractions, alcohols, such as butanol or glycol as well as their ethers and esters, ketones, such as acetone, methyl ethyl ketone, methyl isobutyl ketone or cyclohexanone, strongly polar solvents, such as dimethylformamide and dimethyl sulphoxide, as well as water; by liquefied gaseous extenders or carriers are meant liquids which are gaseous at ambient temperature and under atmospheric pressure, for example aerosol propellants, such as halogenated hydrocarbons as well as butane, propane, nitrogen and carbon dioxide; as solid carriers there are suitable: for example ground natural minerals, such as kaolins, clays, talc, chalk, quartz, attapulgite, montmorillonite or diatomaceous earth, and ground synthetic minerals, such as highly disperse silica, alumina and silicates; as solid carriers for granules there are suitable: for example crushed and fractionated natural rocks such as calcite, marble, pumice, sepiolite and dolomite, as well as synthetic granules of inorganic and

organic meals, and granules of organic material such as sawdust, coconut shells, maize cobs and tobacco stalks; as emulsifying and/or foam-forming agents there are suitable: for example non-ionic and anionic emulsifiers, such as polyoxyethylene fatty acid esters, polyoxyethylene fatty alcohol ethers, for example alkylaryl polyglycol ethers, alkylsulphonates, alkyl sulphates, arylsulphonates as well as albumen hydrolysis products; as dispersing agents there are suitable: for example lignin-sulphite waste liquors and methylcellulose.

Adhesives such as carboxymethylcellulose and natural and synthetic polymers in the form of powders, granules or latices, such as gum arabic, polyvinyl alcohol and polyvinyl acetate, as well as natural phospholipids, such as cephalins and lecithins, and synthetic phospholipids, can be used in the formulations. Other additives can be mineral and vegetable oils.

It is possible to use colorants such as inorganic pigments, for example iron oxide, titanium oxide and Prussian Blue, and organic dyestuffs, such as alizarin dyestuffs, azo dyestuffs and metal phthalocyanine dyestuffs, and trace nutrients such as salts of iron, manganese, boron, copper, cobalt, molybdenum and zinc.

The formulations in general contain between 0.1 and 95 per cent by weight of active compound, preferably between 0.5 and 90%.

When used as herbicides, the active compounds according to the invention, as such or in the form of their formulations, can also be used as mixtures with known herbicides, when used as herbicides, finished formulations or tank mixes being possible.

Suitable herbicides for the mixtures are known herbicides, for example anilides such as, for example, diflufenican and propanil; arylcarboxylic acids such as, for example, dichloropicolinic acid, dicamba or picloram; aryloxyalkanoic acids such as, for example, 2,4-D, 2,4-DB, 2,4-DP, fluroxypur, MCPA, MCPP and triclopyr; aryloxy-phenoxy-alkanoic esters such as, for example, diclofop-methyl, fenoxaprop-ethyl, fluazifop-butyl, haloxyfop-methyl and quizalofop-ethyl; azinones such as, for example, chloridazon and norflurazon; carbamates such as, for example, chlorpropham, desmedipham, phenmedipham and propham; chloroacetanilides such as, for example, alachlor, acetochlor, butachlor, metazachlor, metolachlor, pretilachlor and propachlor; dinitroanilines such as, for example, oryzalin, pendimethalin and trifluralin; diphenyl ethers such as, for example, acifluorfen, bifenox, fluoroglycofen, fomesafen, halosafen, lactofen and oxyfluorfen; ureas such as, for example, chlortoluron, diuron, fluometuron, isoproturon, linuron and methabenzthiazuron; hydroxylamines such as, for example, alloxydim, clethodim, cycloxydim, sethoxydim and tralkoxydim; imidazolinones such as, for example, imazethapyr, imazamethabenz, imazapyr and imazaquin; nitriles such as, for example, bromoxynil, dichlobenil

and ioxynil; oxyacetamides such as, for example, mefenacet; sulphonylureas such as, for example, amidosulfuron, bensulfuron-methyl, chlorimuron-ethyl, chlorsulfuron, cinosulfuron, metsulfuron-methyl, nicosulfuron, primisulfuron, pyrazosulfuron-ethyl, thifensulfuron-methyl triasulfuron and tribenuron-methyl; thiocarbamates such as, for example, butylate, cycloate, di-allate, EPTC, esprocarb, molinate, prosulfocarb, thiobencarb and tri-allate; triazines such as, for example, atrazine, cyanazine, simazine, simetryn, terbutryn and terbutylazine; triazinones such as, for example, hexazinone, metamitron and metribuzin; others such as, for example, aminotriazole, benfuresate, bentazone, cinmethylin, clomazone, clopyralid, difenzoquat, dithiopyr, ethofumesate, fluorochloridone, glufosinate, glyphosate, isoxaben, pyridate, quinchlorac, quinmerac, sulphosate and tridiphane.

Mixtures with other known active compounds, such as fungicides, insecticides, acaricides, nematicides, bird repellants, plant nutrients and agents which improve soil structure, are also possible.

When used as herbicides, the active compounds can be used as such, in the form of their formulations or in the use forms prepared therefrom by further dilution, such as ready-to-use solutions, suspensions, emulsions, powders, pastes and granules. They are used in the customary manner, for example by watering, spraying, atomizing or scattering.

When used as herbicides, the active compounds according to the invention can be applied either before or after emergence of the plants.

They can also be incorporated into the soil before sowing.

When used as herbicides, the amount of active compound used can vary within a substantial range. It depends essentially on the nature of the desired effect. In general, the amounts used are between 0.01 and 10 kg of active compound per hectare of soil surface, preferably between 0.05 and 5 kg per hectare.

When used as insecticides and acaricides, the active compounds according to the invention can also be present in their commercially available formulations and in the use forms, prepared from these formulations, as a mixture with other active compounds, such as insecticides, attractants, sterilising agents, acaricides, nematicides, fungicides, growth-regulating substances or herbicides. The insecticides include, for example, phosphates, carbamates, carboxylates, chlorinated hydrocarbons, phenylureas and substances produced by microorganisms.

When used as insecticides and acaricides, the active compounds according to the invention can furthermore be present in their commercially available formulations and in the use forms, prepared from these formulations, as a mixture with synergistic agents. Synergistic agents are

compounds which increase the action of the active compounds, without it being necessary for the synergistic agent added to be active itself.

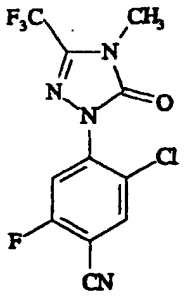
The active compound content of the use forms prepared from the commercially available formulations can vary within wide limits. The active compound concentration of the use forms can be from 0.0000001 to 95 per cent by weight of active compound, preferably between 0.0001 and 1 per cent by weight.

When used as insecticides and acaricides, the compounds are employed in a customary manner appropriate for the use forms.

The preparation and the use of the active compounds according to the invention can be seen from the Examples which follow.

Preparation Examples:

Example 1:



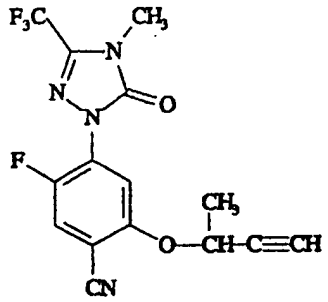
(Process a)

5.3 g (0.038 mol) of potassium carbonate is added at room temperature to 5.3 g (0.032 mol) of 4-methyl-3-trifluoromethyl-1,2,4-triazolin-5-one (compare, for example, US 3,780,052) and 5.5 g (0.032 mol) of 5-chloro-2,4-difluorobenzonitrile in 100 ml of dimethyl sulphoxide, and the mixture is subsequently heated for 36 hours at 100°C. For work-up, the cooled reaction mixture is poured into water, the pH is brought to 2 using dilute hydrochloric acid, and the mixture is extracted several times using dichloromethane. The combined organic phases are dried over sodium sulphate and concentrated in vacuo. The residue is chromatographed over silica gel (eluent:dichloromethane).

1.8 g (18 % of theory) of 1-(2-chloro-4-cyano-5-fluorophenyl)-4-methyl-3-trifluoromethyl-1,2,4-triazolin-5-one

of melting point 105°C are obtained.

Example 2:

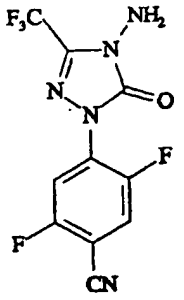


Process (b)

0.6 g (0.014 mol) of sodium hydride (60 % in mineral oil) is added with stirring at room temperature to 1.0 g (0.014 mol) of 3-butin-2-ol in 50 ml of acetonitrile, the mixture is stirred for 15 minutes at room temperature, 2.9 g (0.01 mol) of 1-(2,5-difluoro-4-cyano-phenyl)-4-methyl-3-trifluoromethyl-1,2,4-triazolin-5-one are then added, and the mixture is subsequently stirred for a further 2 hours at room temperature. For work-up, the reaction mixture is concentrated in vacuo, the residue is partitioned between dichloromethane and water, and the organic phase is dried over sodium sulphate and freed from solvent in vacuo.

1.8 g (54 % of theory) of 1-(2-fluoro-4-cyano-5-but-1-in-3-yl-oxy-phenyl)-4-methyl-3-trifluoromethyl-1,2,4-triazolin-5-one of melting point 41°C are obtained.

Example 3:

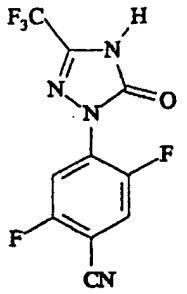


Process (a)

1.7 g (0.012 mol) of potassium carbonate are added at room temperature to 1.7 g (0.01 mol) of 4-amino-3-trifluoromethyl-1,2,4-triazolin-5-one and 1.6 g (0.01 mol) of 2,4,5-trifluorobenzonitrile (compare, for example, EP 191,181) in 30 ml of dimethyl sulphoxide, and the mixture is subsequently stirred for a further 14 hours at room temperature. For work-up, the reaction mixture is transferred into water, the pH is brought to 2 using dilute hydrochloric acid, and the mixture is extracted several times using dichloromethane. The combined organic phases are dried over sodium sulphate and concentrated in vacuo, and the residue is stirred with water, filtered off with suction and dried.

2.6 g (87 % of theory) of 1-(2,5-difluoro-4-cyano-phenyl)-4-amino-3-trifluoromethyl-1,2,4-triazolin-5-one of melting point 141°C are obtained.

Example 4:



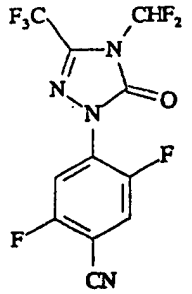
Process (c)

A saturated aqueous solution of 1.4 g (0.02 mol) of sodium nitrite is added at -5°C to 0°C in the course of 15 minutes with stirring to 3.0 g (0.01 mol) of 1-(2,5-difluoro-4-cyano-phenyl)-4-amino-3-trifluoromethyl-1,2,4-triazolin-5-one in 40 ml of 10 % strength hydrochloric acid, the cold bath is subsequently removed, the mixture is stirred for 1 hour at room temperature and is then again cooled to -5°C to 0°C and filtered, and the residue is washed with water and dried.

1.8 g (62 % of theory) of 1-(2,5-difluoro-4-cyano-phenyl)-3-trifluoromethyl-1,2,4-triazolin-5-one of melting point 51°C are obtained.

Example 5:

Process (d)

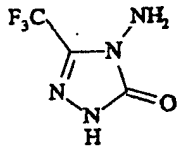


15 g (0.17 mol) of chlorodifluoromethane are passed at 0°C to 10°C in the course of 5 hours into a suspension of 2.5 g (0.009 mol) of 1-(2,5-difluoro-4-cyanophenyl)-3-trifluoromethyl-4H-1,2,4-triazolin-5-one, 1.0 g (0.017 mol) of potassium hydroxide and 0.25 g of tetrabutylammonium bromide in 50 ml of tetrahydrofuran, and, during this time, the consumption of base is compensated for after 1, 2 and 3 hours in each case by adding further 1.0 g portions (0.017 mol) of potassium hydroxide. For work-up, the reaction mixture is poured into water and extracted several times using ethyl acetate, the combined organic phases are dried over sodium sulphate, and the solvent is subsequently removed in vacuo. The residue is chromatographed over silica gel (eluent: dichloromethane).

2.2 g (75 % of theory) of 1-(2,5-difluoro-4-cyanophenyl)-3-trifluoromethyl-4-difluoromethyl-1,2,4-triazolin-5-one of melting point 68°C are obtained.

Preparation of the starting compounds:

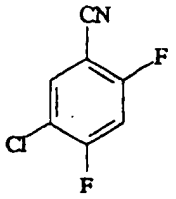
Example II-1:



2782 g (13 mol) of diphenyl carbonate are added in portions in the course of 2 hours with stirring and ice-cooling to 1300 g (26 mol) of hydrazine hydrate in such a way that the temperature of the reaction mixture does not rise above 30°C, the mixture is subsequently stirred for 2 hours at 80°C and then cooled again, and 3164 g (26 mol) of trifluoroacetic acid are added, also in portions. The mixture is then stirred for another 2 hours at 80°C, and water is subsequently distilled off until the residue has reached a temperature of 180°C. When cooled, 1100 g (16.2 mol) of aqueous ammonia (25 % strength) are added, and the mixture is heated for 3 hours at reflux temperature. For work-up, all volatile components are distilled off under gradually reduced pressure (down to 20 mbar) until the residue has reached a temperature of 180°C, and the residue is recrystallised from 2000 ml of water, filtered off with suction and dried.

702 g (32 % of theory) of 3-trifluoromethyl-4-amino-1H-1,2,4-triazolin-5-one of melting point 163°C are obtained.

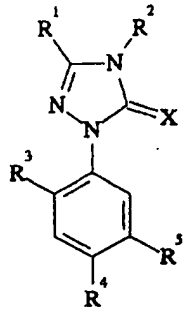
Example III-1:



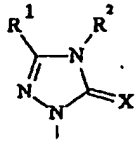
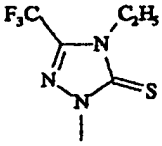
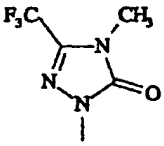
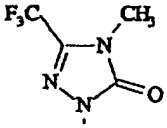
220 g (1.06 mol) of 2,4,5-trichlorobenzonitrile (compare, for example, EP 441,004) are added with stirring at room temperature to 250 g (4.31 mol) of potassium fluoride in 400 ml of distilled tetramethylene sulphone, and the mixture is subsequently stirred for 10 hours at 195°C to 200°C. For work-up, the mixture is cooled, 500 ml of water are added, and the mixture is subjected to steam distillation. The organic portion is taken up in dichloromethane and the mixture is dried over sodium sulphate, concentrated in vacuo and distilled.

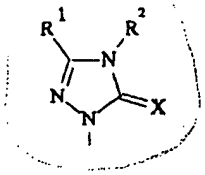
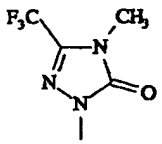
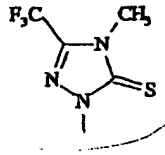
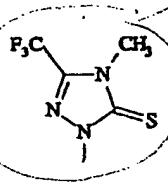
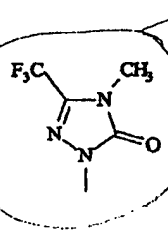
108 g (58 % of theory) of 2,4-difluoro-5-chlorobenzonitrile of boiling point 105-107°C at 30 mbar and of melting point 48-50°C are obtained.

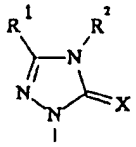
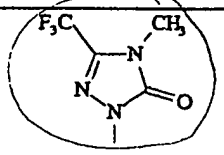
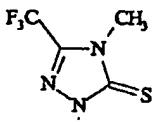
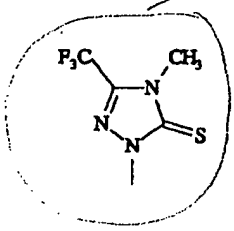
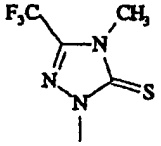
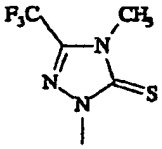
The following substituted triazolinones of the general formula (I) are obtained in a corresponding manner and following the general information on the preparation:

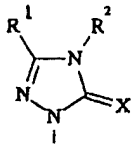
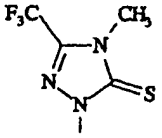
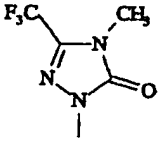
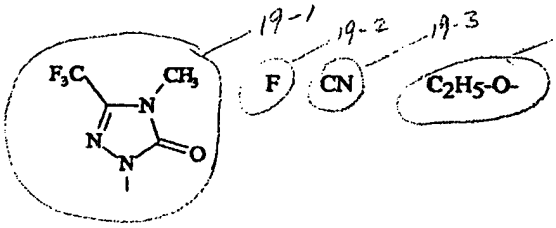
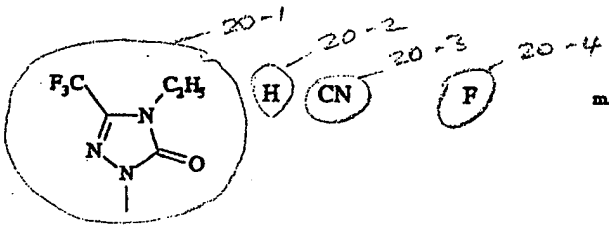


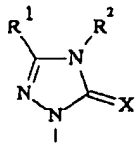
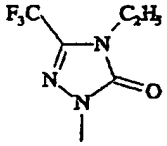
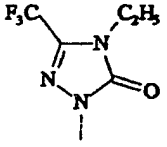
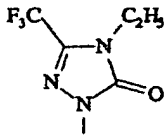
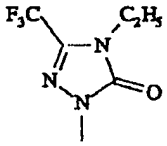
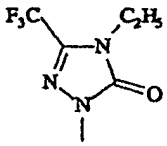
(I)

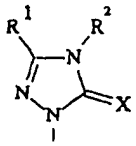
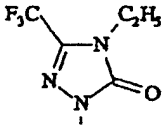
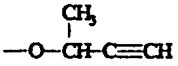
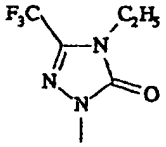
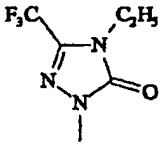
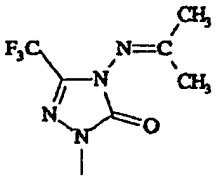
Ex. No.		R^3	R^4	R^5	Physical properties
6		F	CN	F	^1H NMR*): 1.45-1.55; 4.22-4.3; 7.58-7.62
7		F	CN	H	m.p. 99°C
8		Cl	NO_2	H	m.p. 110°C

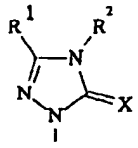
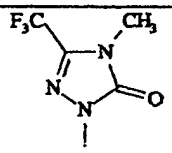
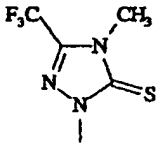
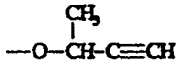
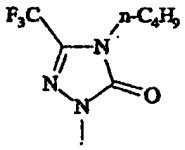
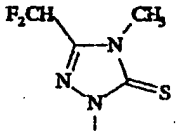
Ex. No.		R^3	R^4	R^5	Physical properties
9		Cl	CN	H	m.p. 108°C
10		F	CN	H	m.p. 96°C
11		F	CN	F	m.p. 103°C
12		F	CN	CH_3-O-	m.p. 56°C

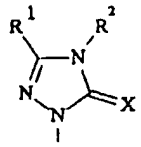
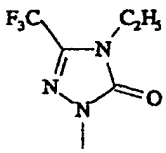
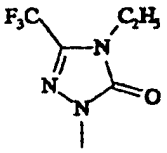
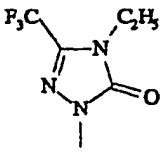
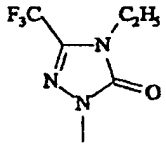
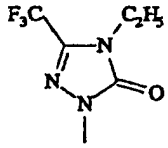
Ex. No.		R^3	R^4	R^5	Physical properties
13		H	CN	F	m.p. 82°C
14		H	CN	F	m.p. 125°C
15		F	CN	CH_3-O-	m.p. 131°C
16		H	CN		m.p. 190°C

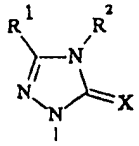
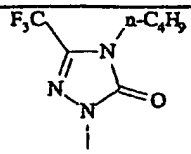
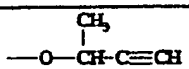
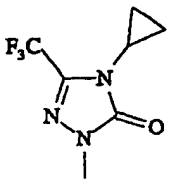
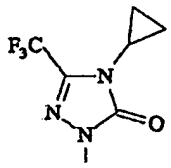
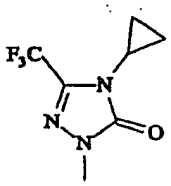
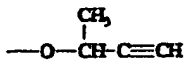
Ex. No.		R^3	R^4	R^5	Physical properties
17		H	CN	CH_3-O-	m.p. 215°C
18		H	CN	CH_3-O-	m.p. 187°C
19		F	CN	C_2H_5-O-	m.p. 126°C
20		H	CN	F	m.p. 130°C

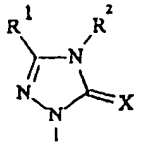
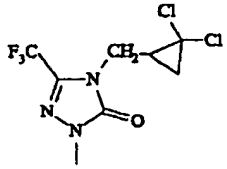
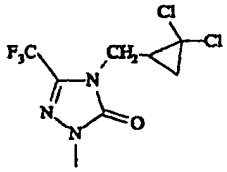
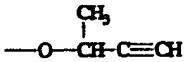
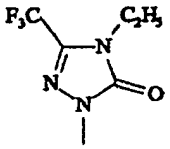
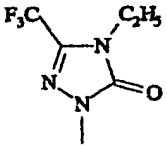
Ex. No.		R^3	R^4	R^5	Physical properties
21		H	CN		m.p. 138°C
22		F	CN	F	m.p. 68°C
23		Cl	CN	H	m.p. 145°C
24		F	CN	H	m.p. 204°C

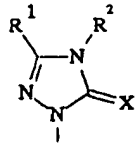
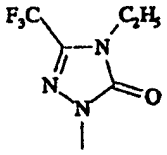
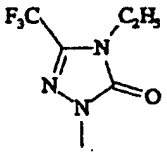
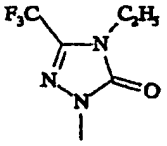
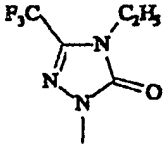
Ex. No.		R^3	R^4	R^5	Physical properties
25		F	CN		^1H NMR*): 1.75-1.78; 2.6; 3.9-4.0
26		F	CN	CH_3-O-	m.p. 133-135°C
27		F	CN	-NH-CH_3	m.p. 143°C
28		F	CN	F	m.p. 148°C

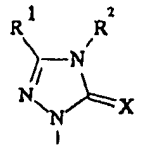
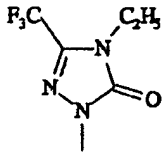
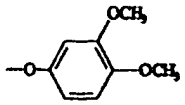
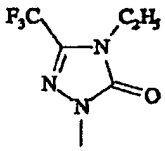
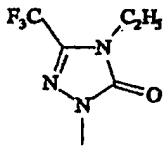
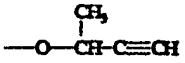
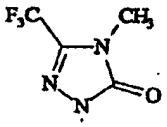
Ex. No.		R^3	R^4	R^5	Physical properties
29		F	CN	F	m.p. 74°C
30		F	CN		m.p. 116°C
31		F	CN	F	^{1}H NMR*): 1.38-1.5; 1.73-1.83; 3.82-3.88
32		F	CN	F	m.p. 177°C

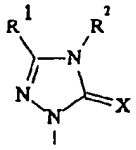
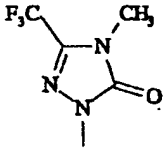
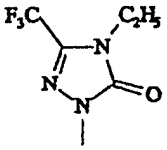
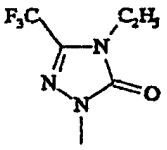
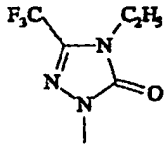
Ex. No.		R^3	R^4	R^5	Physical properties
33		F	NO_2		m.p. 177°C
34		F	CN	$-(O-CH_2-CH_2)_2-OCH_3$	^1H NMR*): 3.48; 3.55-3.6; 3.9-3.97
35		F	CN	$-O-C_2H_5$	^1H NMR*): 1.4-1.46; 1.5-1.55; 3.9-3.98; 4.14-4.2
36		F	CN	$-O-i-C_3H_7$	^1H NMR*): 3.9-3.98; 4.6-4.68; 7.2-7.23; 7.42-7.45

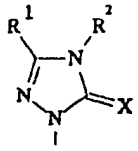
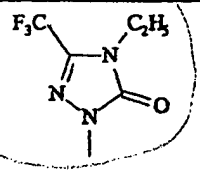
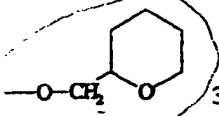
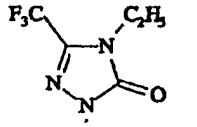
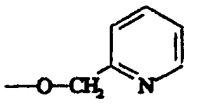
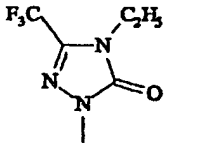
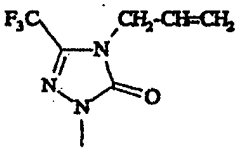
Ex. No.		R^3	R^4	R^5	Physical properties
37		F	CN		^{1}H NMR*): 1.72-1.8; 3.8-3.87; 7.45-7.5
38		F	CN	F	m.p. 90°C
39		F	NO_2	F	m.p. 99°C
40		F	CN		m.p. 95°C

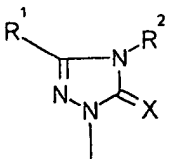
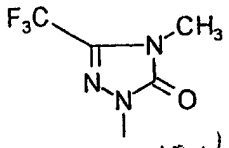
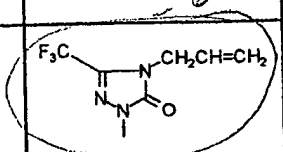
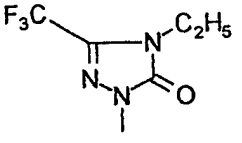
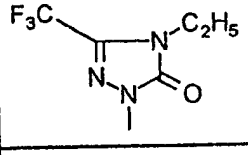
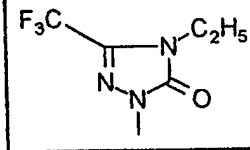
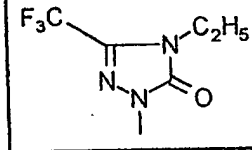
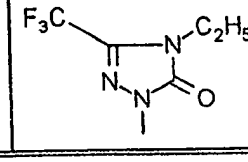
Ex. No.		R^3	R^4	R^5	Physical properties
41		F	CN	F	^{1}H NMR*): 1.75-1.8; 2.08-2.18; 3.85-3.92; 7.03-7.18
42		F	CN		^{1}H NMR*): 1.75-1.8; 4.33-4.42; 4.9-4.98; 7.45-7.5
43		F	CN	$-O-CH_2-Si(CH_3)_3$	m.p. 101°C
44		F	CN	$-O-CH_2-CH=CH_2$	m.p. 76°C

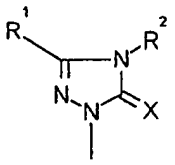
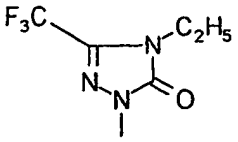
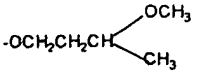
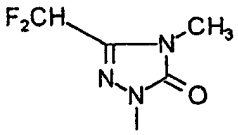
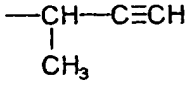
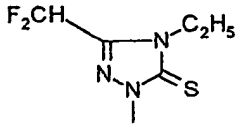
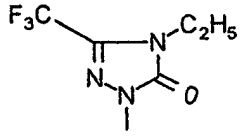
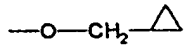
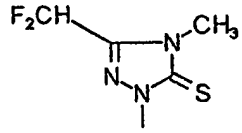
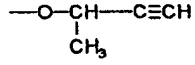
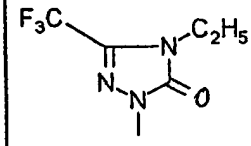
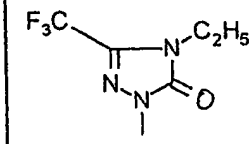
Ex. No.		R^3	R^4	R^5	Physical properties
45		F	CN	$-O-(CH_2)_2-O-i-C_3H_7$	^1H NMR*): 1.18-1.22; 1.4-1.45; 3.8-3.85; 4.22-4.25
46		F	CN	$-O-(CH_2)_2-CH(CH_3)=CH_2$	^1H NMR*): 1.85; 3.9-3.98; 4.15-4.2; 7.2-7.23
47		F	CN	$-O-CH(CH_3)-CH_2-OCH_3$	^1H NMR*): 3.4; 3.9-3.98; 7.1-7.13; 7.38-7.42
48		Cl	CN	F	m.p. 121°C

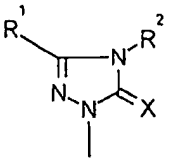
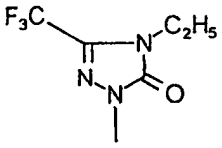
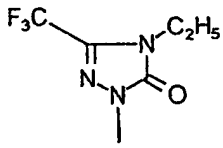
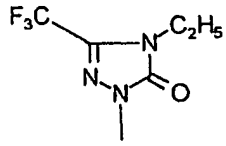
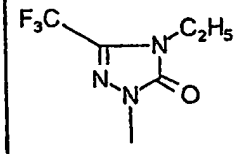
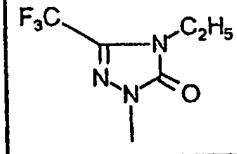
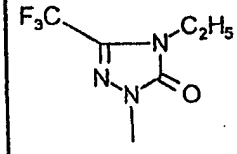
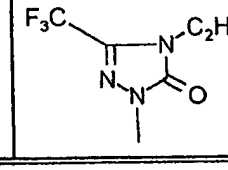
Ex. No.		R^3	R^4	R^5	Physical properties
49		F	CN		m.p. 154°C
50		F	CN	$-N(CH_3)_2$	^1H NMR*): 3.17; 3.9-3.98; 7.1-7.13; 7.38-7.42
51		Cl	CN		^1H NMR*): 1.75-1.8; 3.9-3.98; 4.9-5.0; 7.35; 7.75
52		Cl	CN	$-O-CH_3$	m.p. 133°C

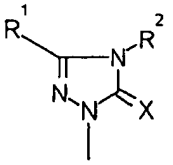
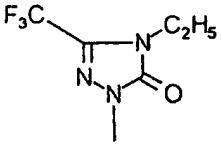
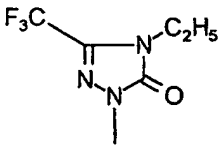
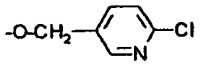
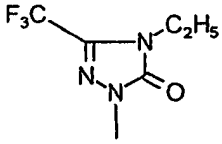
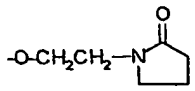
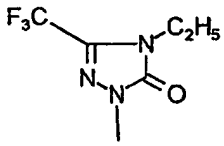
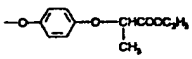
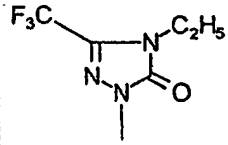
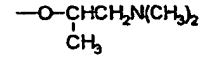
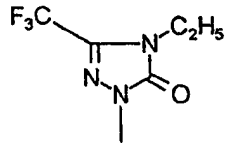
Ex. No.		R^3	R^4	R^5	Physical properties
53		F	CN	-O-n-C_3H_7	m.p. 71°C
54		F	CN	—O—CH_2—C≡CH	^{1}H NMR*): 2.53; 3.9-3.98; 4.85; 7.4-7.42
55		F	CN	-O-$(CH_2)_2$-S-C_2H_5	^{1}H NMR*): 2.67-2.78; 3.9-3.98; 4.22-4.3; 7.23-7.25
56		Cl	CN	Cl	m.p. 97°C

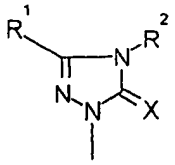
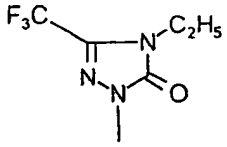
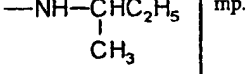
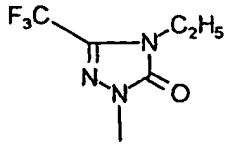
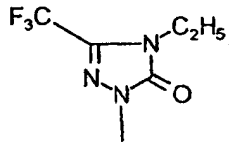
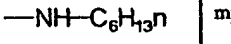
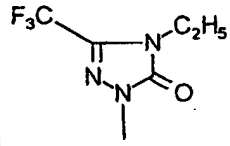
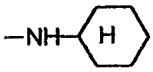
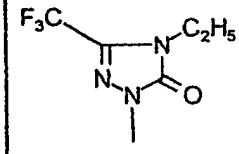
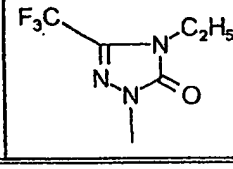
Ex. No.		R^3	R^4	R^5	Physical properties
	57-1		57-2	57-3	57-4
57		F	CN		^{1}H NMR*): 1.45-1.65; 3.9-3.98; 3.95-4.05; 7.25-7.28
58		F	CN		m.p. 94°C
59		F	CN	-S-C_2H_5	^{1}H NMR*): 3.05-3.1; 3.9-3.98; 7.5-7.55; 7.67-7.7
60		F	CN	F	^{1}H NMR*): 4.48-4.5; 5.35-5.4; 5.87-5.97; 7.5-7.56

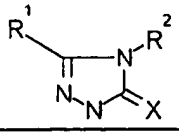
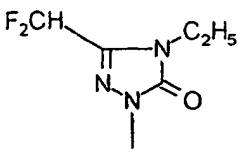
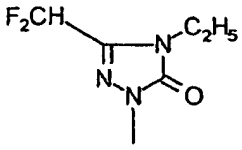
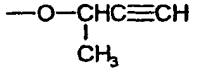
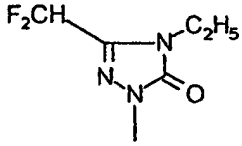
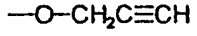
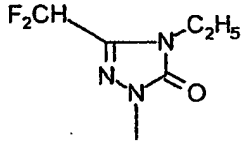
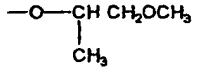
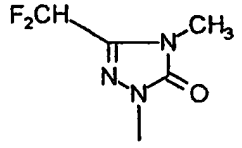
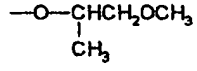
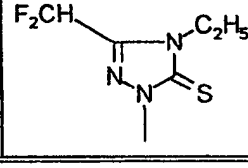
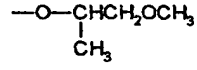
Ex. No.		R^3	R^4	R^5	Physical properties
61		F	CN	-O-n-C_3H_7	mp.33°C
62		F	CN	—O—CH(CH$_3$)—C≡CH	^{1}H-NMR: 1,75-1,78; 4,45-4,48; 7,45-7,50.
63		F	CN	-NH-CH_2CH=CH_2	^{1}H-NMR: 1,40-1,45; 3,85-3,90; 6,83-6,86.
64		F	CN	—O—CH_2—(oxetan-3-yl, 3-CH$_3$)	mp.101°C
65		F	CN	—O—CH_2—(tetrahydrofuran-2-yl)	^{1}H-NMR: 1,40-1,45; 4,08-4,15; 7,45-7,48.
66		F	CN	—O—CH_2—(furan-2-yl)	mp. 91°C
67		F	CN	-O-CH($CH_2OC_2H_5$)$_2$	^{1}H-NMR: 3,52 - 3,60; 3,90-3,98; 4,55-4,60.

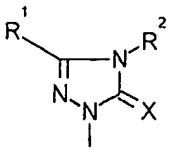
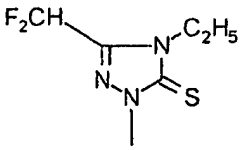
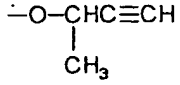
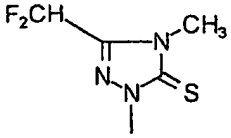
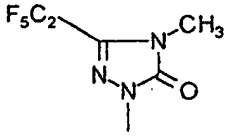
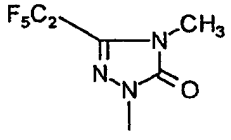
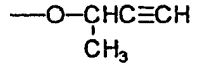
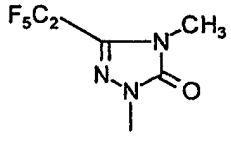
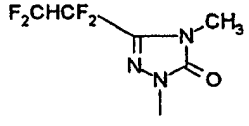
Ex. No.		R^3	R^4	R^5	Physical properties
68		F	CN		mp.81°C
69		F	CN		^{1}H-NMR: 2,60;4,90-4,98; 7,45-7,50.
70		F	CN	F	mp.161°C
71		F	CN		mp.96°C
72		F	CN		mp.176°C
73		F	CN	$-O-(CH_2CH_2O)_5CH_3$	^{1}H-NMR: 3,52-3,56; 3,60-3,70; 4,75-4,78.
74		F	CN	$-O-(CH_2CH_2O)_2CH_2CH=CH_2$	^{1}H-NMR: 3,60-3,65; 3,88-3,96; 5,85-6,00.

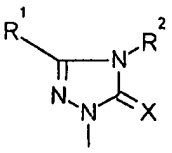
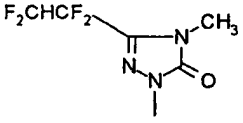
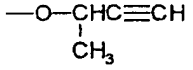
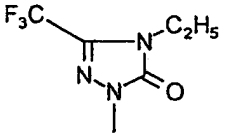
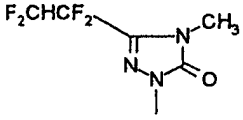
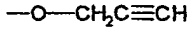
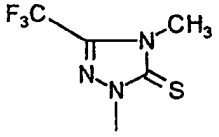
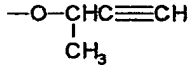
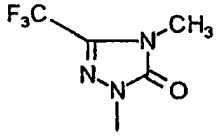
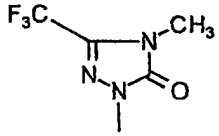
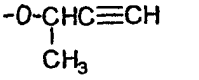
Ex. No.		R^3	R^4	R^5	Physical properties
75		F	CN	$-O-CH_2CH=CHCH_3$	mp.117°C
76		F	CN	$-O-\underset{CH_3}{\underset{\vert}{C}}HCH=CH_2$	mp. 47°C
77		F	CN	$-O-\underset{CH_2N(CH_3)_2}{\overset{CH=CH_2}{\underset{\vert}{\overset{\vert}{C}}}}H$	^{1}H-NMR: 2,37; 3,90-3,98; 5,82-5,95.
78		F	CN	$-O-\underset{CH_3}{\underset{\vert}{C}}HCH_2CH_2CH_3$	mp.74°C
79		F	CN	$-O-CH_2CH(CH_3)_2$	mp.87°C
80		F	CN	$-O-\underset{CH_3}{\underset{\vert}{C}}HCH_2CH_3$	^{1}H-NMR: 3,90-3,98; 4,38-4,45; 7,43-7,46.
81		F	CN	$-O-CH_2CH_2CH(CH_3)_2$	mp. 75°C

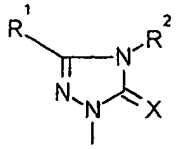
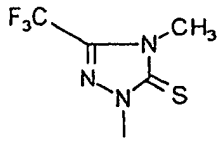
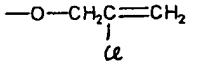
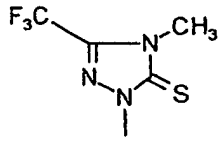
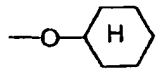
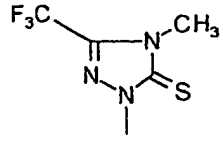
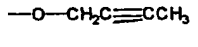
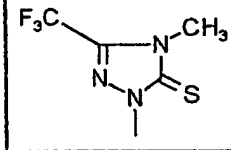
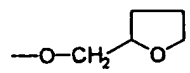
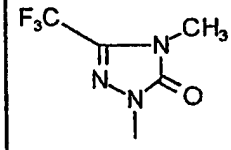
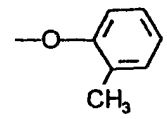
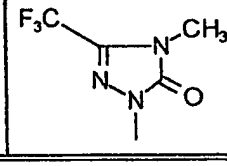
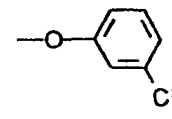
Ex. No.		R^3	R^4	R^5	Physical properties
82		F	CN	$-O-CH_2C(CH_3)_3$	mp.117°C
83		F	CN		mp.141°C
84		F	CN		mp. 143°C
85		F	CN		^{1}H-NMR: 3,85-3,92; 4,16-4,26; 4,70-4,76.
86		F	CN		^{1}H-NMR: 2,32; 3,90-3,98; 4,53-4,60.
87		F	CN	$-OCH_2CH_2OCH_2CH_2N(CH_3)_2$	mp.65°C

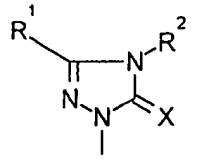
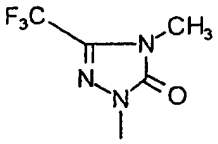
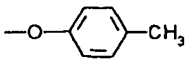
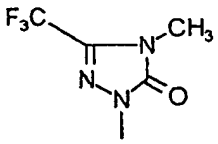
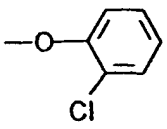
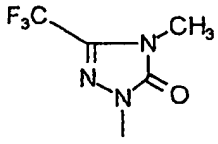
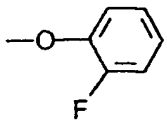
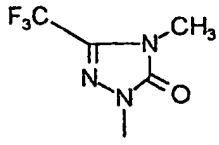
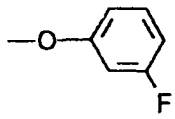
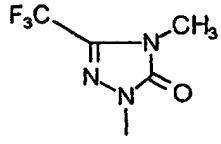
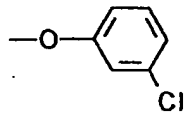
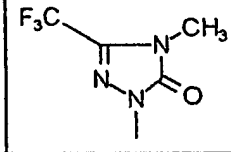
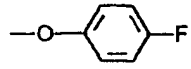
Ex. No.		R^3	R^4	R^5	Physical Properties
88		F	CN		mp. 91°C
89		F	CN		mp.100°C
90		F	CN		mp.86°C
91		F	CN		mp. 126°C
92		F	NO_2	F	mp. 81°C
93		F	CN	$-NHCH_2CH_2OCH_3$	mp. 57°C

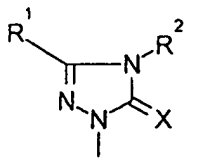
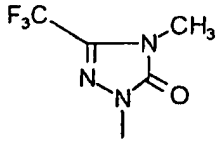
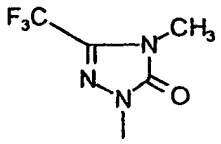
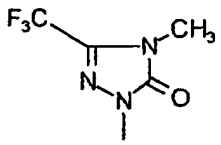
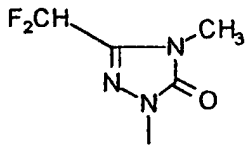
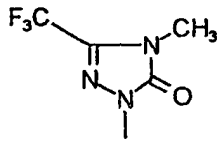
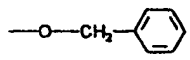
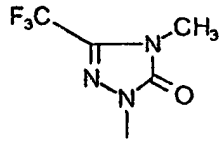
Ex. No.		R^3	R^4	R^5	Physical properties
94		F	CN	F	mp.117°C
95		F	CN		mp.96°C
96		F	CN		^{1}H-NMR: 2,62-2,64; 3,95-4,02; 4,85.
97		F	CN		mp.78°C
98		F	CN		^{1}H-NMR: 1,28-1,30; 3,40; 3,50; 4,55-4,65.
99		F	CN		mp. 90°C

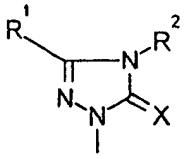
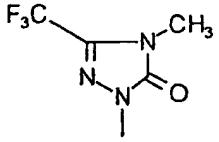
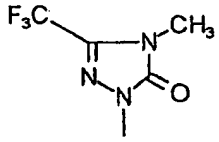
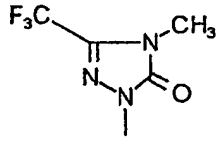
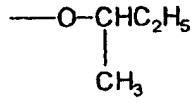
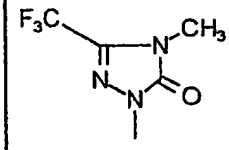
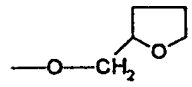
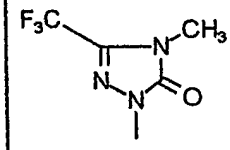
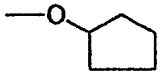
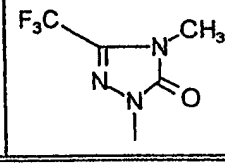
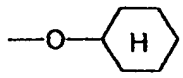
Ex. No.		R^3	R^4	R^5	Physical properties
100		F	CN		mp. 134°C
101		F	CN	$-O-CH(CH_3)_2$	mp.135°C
102		F	CN	F	mp. 96°C
103		F	CN		mp.115°C
104		F	CN	$-O-CH_2C\equiv CH$	(Sirup)
105		F	CN	F	mp.110°C

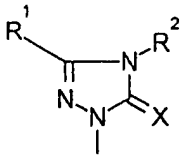
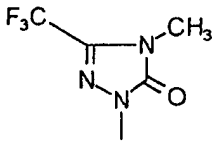
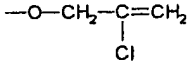
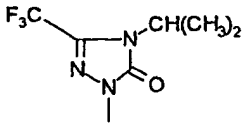
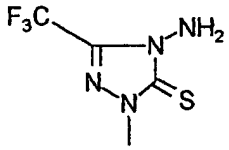
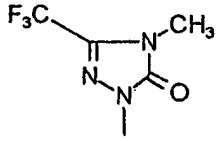
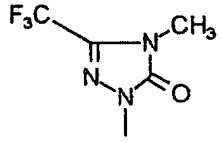
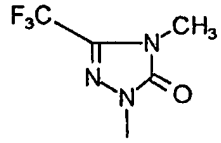
Ex. No.		R^3	R^4	R^5	Physical properties
106		F	CN		mp.88°C
107		F	CN	NH_2	mp.193°C
108		F	CN		mp.83°C
109		Cl	CN		mp 104°C
110		F	NO_2	F	mp.72°C
111		F	NO_2		mp.72°C

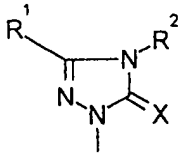
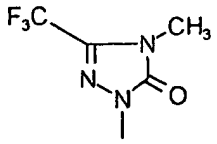
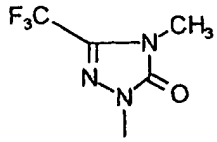
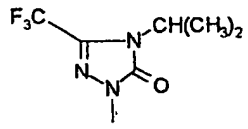
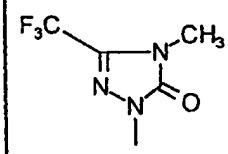
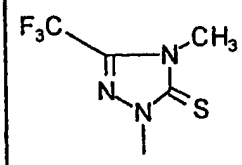
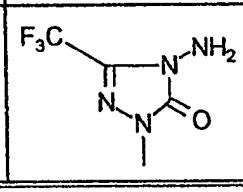
Ex. No.		R^3	R^4	R^5	Physical properties
112		F	CN		mp.82°C
113		F	CN		
114		F	CN		mp.138°C
115		F	CN		mp. 72°C
116		F	CN		wax
117		F	CN		n_D^{20} = 1,5373

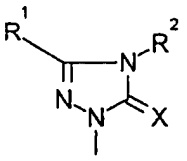
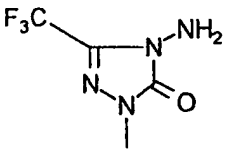
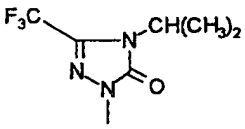
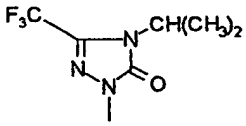
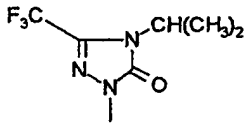
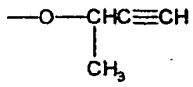
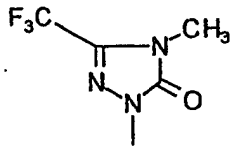
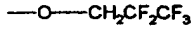
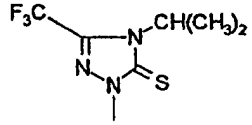
Ex. No.		R^3	R^4	R^5	Physical properties
118		F	CN		mp.121°C
119		F	CN		mp.112°C
120		F	CN		mp. 132°C
121		F	CN		mp.74°C
122		F	CN		mp.45°C
123		F	CN		mp.150°C

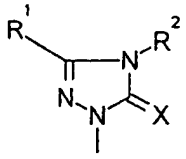
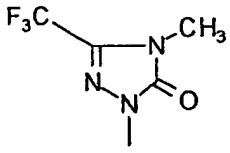
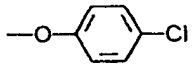
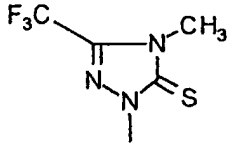
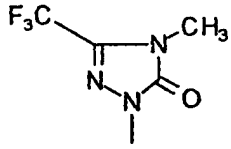
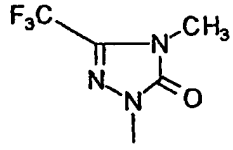
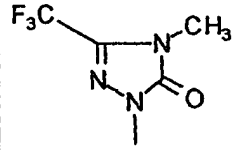
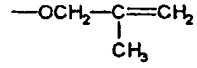
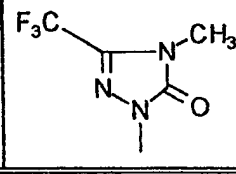
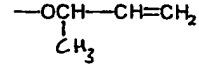
Ex. No.		R^3	R^4	R^5	Physical properties
124		F	CN	$-NHC_3H_7n$	mp.124°C
125		F	CN	$-NHC_2H_5$	mp. 134°C
126		F	CN	NH_2	mp.126°C
127		F	CN	F	mp.116°C
128		F	CN		mp. 98°C
129		F	CN	$-O-CH_2CH(CH_3)_2$	mp.53°C

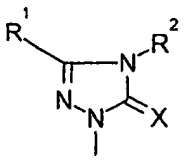
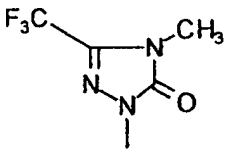
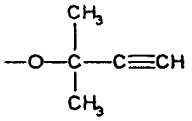
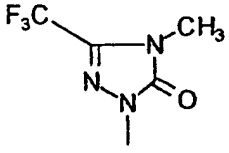
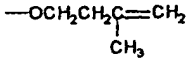
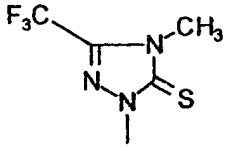
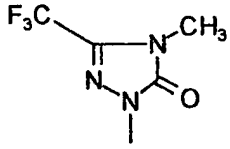
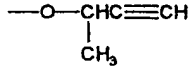
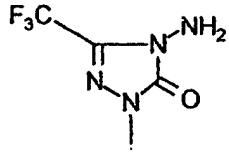
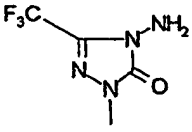
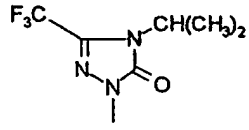
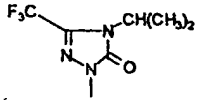
Ex. No.		R^3	R^4	R^5	Physical properties
130		F	CN	O-C_4H_9n	mp.50°C
131		F	CN	-O-$CH_2COOC_2H_5$	mp. 214°C
132		F	CN		
133		F	CN		mp.58°C
134		F	CN		mp.66°C
135		F	CN		

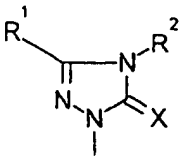
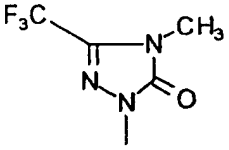
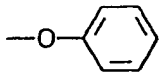
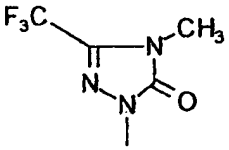
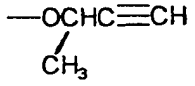
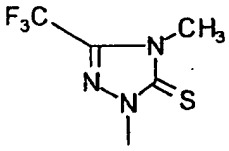
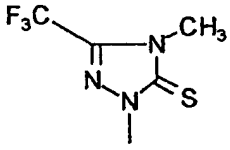
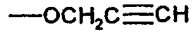
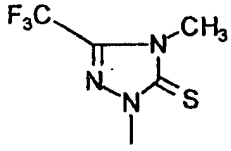
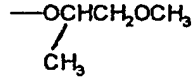
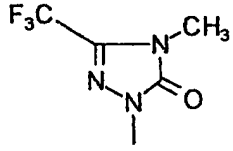
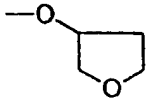
Ex. No.		R	R^4	R^5	Physical Properties
136		F	CN		mp.53°C
137		F	CN	F	n_D^{20} = 1,5012
138		F	CN	F	mp.69°C
139		F	CN	$-O-CH_2CH=CH_2$	mp. 45°C
140		F	CN	$-OCH_2C\equiv CH$	mp.99°C
141		F	CN	$-OCH_2CH_2SC_2H_5$	

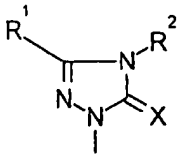
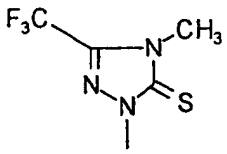
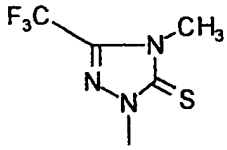
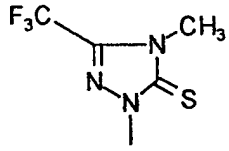
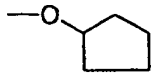
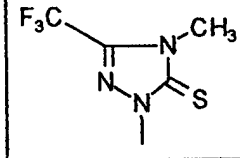
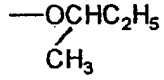
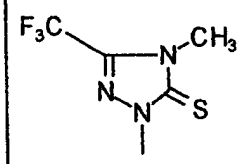
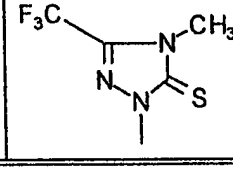
Ex. No.		R	R^4	R^5	Physical properties
142		F	CN	$-O-CH_2Si(CH_3)_3$	mp.89°C
143		F	CN	$-O-\underset{CH_3}{\underset{\vert}{CH}}CH_2OCH_3$	
144		F	CN	-OCH	mp.133°C
145		H	CN	CN	mp.148°C
146		H	CN	CN	mp.78°C
147		H	CN	F	mp.168°C

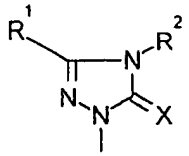
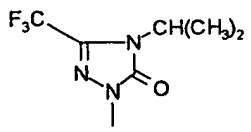
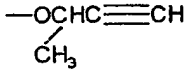
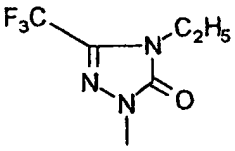
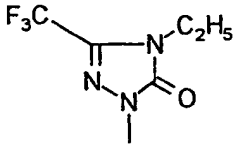
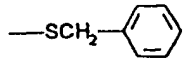
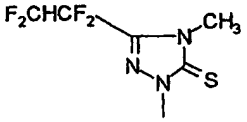
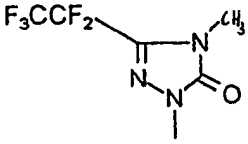
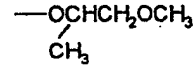
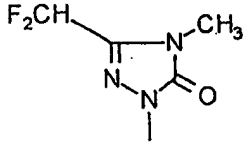
Ex. No.		R^3	R^4	R^5	Physical properties
148		H	CN	CN	mp.85°C
149		H	CN	CN	mp.128°C
150		H	CN	F	mp.76°C
151		F	CN		
152		F	CN		
153		F	CN	F	mp. 44°C

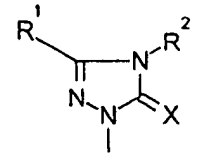
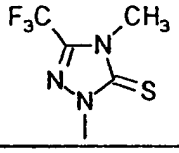
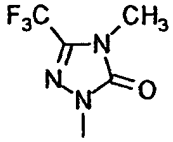
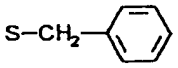
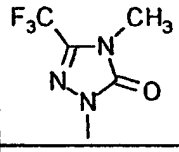
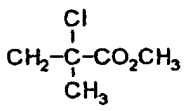
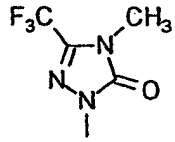
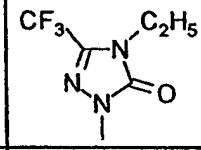
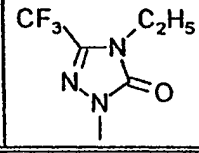
Ex. No.		R^3	R^4	R^5	Physical properties
154		F	CN		mp.111°C
155		Cl	CN	F	mp.110°C
156		F	CN	$-OCH_2C{\equiv}CCH_3$	mp.70°C
157		F	CN	$-OCH_2CH{=}CHCH_3$	mp.57°C
158		F	CN		n_D^{20} = 1,5200
159		F	CN		n_D^{20} = 1,5149

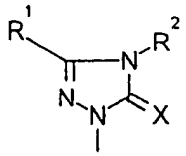
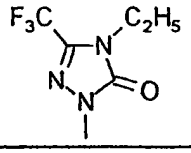
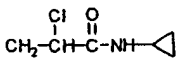
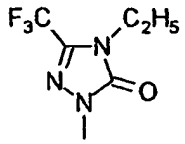
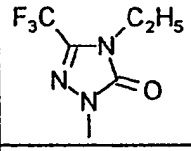
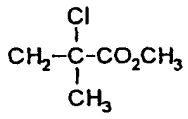
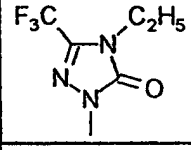
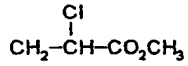
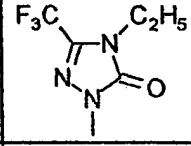
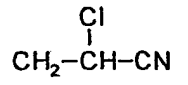
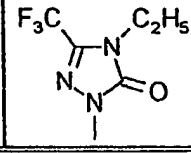
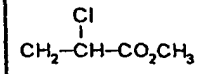
Ex. No.		R^3	R^4	R^5	Physical properties
160		F	CN		mp. 84°C
161		F	CN		mp. 80°C
162		F	CN	$-OC_3H_7n$	mp. 92°C
163		Cl	CN		
164		H	CN		mp.202°C
165		H	CN		mp.142°C

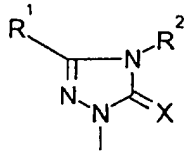
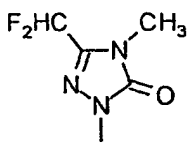
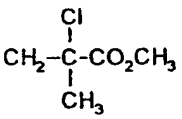
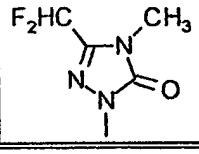
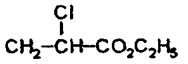
Ex. No.		R^3	R^4	R^5	Physical properties
166		F	CN		mp.54°C
167		H	CN		mp. 140°C
168		F	CN	-OCH(CH_3)2	mp. 61°C
169		F	CN		mp. 142°C
170		F	CN		
171		F	CN		mp. 86°C

Ex. No.		R^3	R^4	R^5	Physical properties
172		F	CN	$-OC_2H_5$	mp.150°C
173		F	CN	$-OC_4H_9n$	mp.37°C
174		F	CN		mp. 104°C
175		F	CN		mp. 33°C
176		F	CN	$-OCH_2CH(CH_3)_2$	mp. 79°C
177		F	CN	$-OCH_2CH=CH_2$	mp.100°C

Ex. No.		R^3	R^4	R^5	Physical properties
178		H	CN		mp.108°C
179		F	CN	Cl	mp. 53°C
180		F	CN		^{1}H-NMR: 3,90-3,96; 4,20; 7,65-7,68.
181		F	CN	F	mp. 85°C
182		F	CN		^{1}H-NMR: 1,38-1,40; 3,40; 4,57-4,62, 7,40-7,45.
183		F	CN	NH_2	mp. 208°C

Ex. No.		R^3	R^4	R^5	Physical properties
184		F	CN	NH_2	mp. 182°C
185		F	CN		mp. 77°C
186		F	CN		oil
187		F	NO_2	$OCH_2C{\equiv}CH$	oil
188		F	CN	$N(CH_2C{\equiv}CH)_2$	oil
189		F	CN	CH_2CCl_3	mp. 114°C

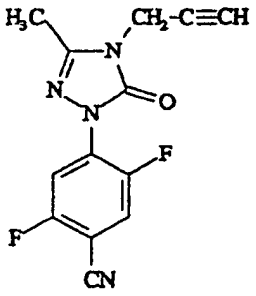
Ex. No.		R^3	R^4	R^5	Physical properties
190		F	CN		Oil
191		F	CN	OH	mp. 193°C
192		F	CN		Oil
193		F	CN		mp. 88°C
194		F	CN		mp: 140°C
195		F	CN		Oil

Ex. No.		R^3	R^4	R^5	Physical properties
196		F	CN		mp. 113°C
197		F	CN		oil

*) The ^1H NMR spectra were recorded in deuterochloroform ($CDCl_3$) with tetramethylsilane (TMS) as the internal standard. The data given represent the chemical shift as δ value in ppm.]

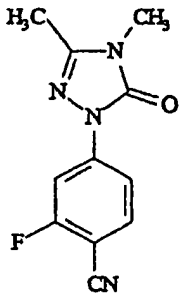
Use Examples:

In the use examples which follow, the compounds listed below were used as comparison substances:



(A)

3-Methyl-4-propargyl-1-(2,5-difluoro-4-cyano-phenyl)-1,2,4-triazolin-5-one



(B)

3,4-Dimethyl-1-(3-fluoro-4-cyano-phenyl)-1,2,4-triazolin-5-one (both disclosed in DE 3,839,480)

Example A

Pre-emergence test

Solvent: 5 parts by weight of acetone
Emulsifier: 1 part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, one part by weight of active compound is mixed with the stated amount of solvent, the stated amount of emulsifier is added and the concentrate is diluted with water to the desired concentration.

Seeds of the test plants are sown in normal soil and, after 24 hours, watered with the preparation of the active compound. It is expedient to keep constant the amount of water per unit area. The concentration of the active compound in the preparation is of no importance, only the amount of active compound applied per unit area being decisive. After three weeks, the degree of damage to the plants is rated in % damage in comparison to the development of the untreated control.

The figures denote:

0 % = no action (like untreated control)
100 % = total destruction

While Comparison Example (A) exhibits no herbicidal

activity against weeds such as Setaria, Amaranthus, Chenopodium, Galinsoga, Matricaria, Solanum and Viola, at an application rate of 250 g/ha, activities between 40 and 100 % are shown, in this test, for example, by the compounds of Preparation Examples 7, 9, 17 and 29 and activities between 95 and 100 % by the compounds of Preparation Examples 10, 11, 12, 15 and 19.

Example B:

Tetranychus test (OP resistant)

Solvent: 7 parts by weight of dimethylformamide
Emulsifier: 1 part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent and the stated amount of emulsifier, and the concentrate is diluted with water to the desired concentrations.

Bean plants (Phaseolus vulgaris) which are severely infested with all developmental stages of the two-spotted spider mite (Tetranychus urticae) are dipped into a preparation of active compound at the desired concentration.

After the specified period of time, the mortality in per cent is determined. 100 %

means that all the spider mites have been killed; 0 % means that no spider mite has been killed.

In this test, a clearly superior acaricidal activity compared with Example (B), which is known from the prior art, is shown, for example, by compound 13 of the preparation examples.

Example C

Phaedon-test

Solvent: 31 parts by weight of acetone

Emulsifier: 1 part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, one part by weight of active compound is mixed with the stated amount of solvent, the stated amount of emulsifier is added and the concentrate is diluted with water to the desired concentration.

Cabbage leaves are treated with that suitable preparation of active compound. A such treated leave is put into a plastic box together with two Phaedon cochleariae in development stage. After 3 days an untreated leave is added. After the specified period of time, the mortality in per cent is determined. 100% means that all the Phaedon cochleariae have been killed; 0% means that no Phaedon cochleariae has been killed.

In this test a clearly superior acaricidal activity compared with the prior art is shown, for example, by compounds 20 and 62.

Example D

Myzus-test

Solvent: 31 parts by weight of acetone

Emulsifier: 1 part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, one part by weight of active compound is mixed with the stated amount of solvent, the stated amount of emulsifier is added and the concentrate is diluted with water to the desired concentration.

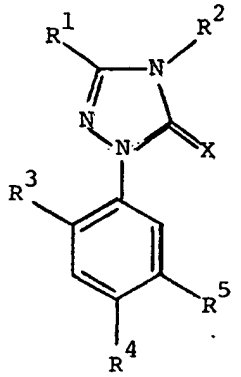
Shoots of Vicia faba, which are stricken by Myzus persicae, are treated with such preparation of active compound in suitable concentration and put into a plastic box.

After the specified period of time the mortality in percent is determined. 100% means that all Myzus persicae have been killed; 0% means that no Myzus persicae has been killed.

In this test a clearly superior acaricidal activity in comparison to the prior art is shown for examles 57 and 62.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A substituted triazolinone of the general formula (I)



(I)

in which

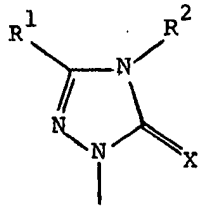
R^1 represents halogenoalkyl,

R^2 represents hydrogen, amino, cyano, alkyl, alkenyl, alkinyl, halogenoalkyl, halogenoalkenyl, halogenoalkinyl, alkoxyalkyl, alkylideneimino, or in each case optionally substituted cycloalkyl or cycloalkylalkyl,

R^3 represents hydrogen or halogen,

R^4 represents cyano or nitro,

R^5 represents nitro, cyano, halogen, heterocyclyl-alkoxy, a radical of the formula R^6, $-O-R^6$, $-S-R^6$, $-S(O)-R^6$, $-SO_2-R^6$, $-SO_2-O-R^6$, $-O-SO_2-R^6$, $-C(O)-O-R^6$, $-NR^6R^7$, $-SO_2-NR^6R^7$, $-C(O)-NR^6R^7$, $-NH-P(O)(OR^6)(R^7)$ or $-NH-P(O)(OR^6)(OR^7)$ or a radical of the formula



and

X represents oxygen or sulphur, where

R^6 and R^7 independently of one another in each case represent hydrogen or in each case straight-chain or branched, optionally substituted alkyl, alkenyl, alkinyl, cycloalkyl, cycloalkylalkyl, arylalkyl or aryl.

2. A substituted triazolinone of the general formula (I) according to claim 1, characterised in that

R^1 represents straight-chain or branched halogenoalkyl having 1 to 6 carbon atoms and 1 to 13 identical or different halogen atoms,

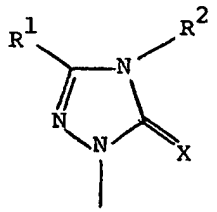
R^2 represents hydrogen, amino, cyano, straight-chain or branched alkyl having 1 to 8 carbon atoms, in each case straight-chain or branched alkenyl or alkinyl, each of which has 2 to 6 carbon atoms, straight-chain or branched halogenoalkyl having 1 to 6 carbon atoms and 1 to 13 identical or different halogen atoms, in each case straight-chain or branched halogeno-alkenyl or halogenoalkinyl, each of which has 2 to 6 carbon atoms and 1 to 11 identical or different halogen atoms, straight-chain or branched alkoxyalkyl having 1 to 4 carbon atoms in each of the individual alkyl moieties, straight-chain or branched alkyl-

ideneimino having 1 to 8 carbon atoms, or cycloalkyl or cycloalkylalkyl, each of which has 3 to 8 carbon atoms in the cycloalkyl moiety and, if appropriate, 1 to 4 carbon atoms in the straight-chain or branched alkyl moiety, and each of which is optionally monosubstituted or polysubstituted in the cycloalkyl moiety by identical or different halogen substituents,

R^3 represents hydrogen, fluorine, chlorine, bromine or iodine,

R^4 represents cyano or nitro,

R^5 represents nitro, cyano, fluorine, chlorine, bromine, iodine or heterocyclyl-C_1-C_4-alkoxy, the heterocyclyl radical being represented by a three- to seven-membered, optionally benzo-fused, saturated or unsaturated heterocycle having 1 to 3 identical or different hetero atoms, selected from oxygen and sulphur, or a radical of the formula R^6, $-O-R^6$, $-S-R^6$, $-S(O)-R^6-$, $-SO_2-R^6$, $-SO_2-O-R^6$, $-O-SO_2-R^6$, $-C(O)-O-R^6$, $-NR^6R^7$, $-SO_2-NR^6R^7$, $-C(O)-NR^6R^7$, $-NH-P(O)(OR^6)(R^7)$ or $-NH-P(O)(OR^6)(OR^7)$ or a radical of the formula



and

X represents oxygen or sulphur, where

R^6 and R^7 independently of one another in each case represent hydrogen or straight-chain or branched alkyl which has

1 to 8 carbon atoms and which is optionally monosubstituted or polysubstituted by identical or different substituents, the substituents being:

halogen, in particular fluorine, chlorine, bromine and/or iodine, cyano, carboxyl, carbamoyl, in each case straight-chain or branched alkoxy, alkoxyalkoxy, alkylthio, alkylsulphinyl, alkylsulphonyl, alkoxycarbonyl, alkoxycarbonylalkyl, N-alkyl-aminocarbonyl, cycloalkylaminocarbonyl, N,N-dialkylaminocarbonyl, trialkylsilyl or alkylsulphonylaminocarbonyl, each of which has 1 to 8 carbon atoms in the individual alkyl moieties, or heterocyclyl, the heterocyclyl being represented by a five- to seven-membered, optionally benzo-fused, saturated or unsaturated heterocycle having 1 to 3 identical or different hetero atoms, selected from nitrogen, oxygen and sulphur;

R^6 and R^7 furthermore represent alkenyl or alkinyl, each of which has 2 to 8 carbon atoms and each of which is optionally monosubstituted or polysubstituted by identical or different halogen substitutents;

R^6 and R^7 furthermore represent cycloalkyl which has 3 to 7 carbon atoms and which is optionally monosubstituted or polysubstituted by identical or different halogen substitutents, and/or by straight-chain or branched alkyl having 1 to 4 carbon atoms, or represent C_3-C_7-cycloalkyl-C_1-C_3-alkyl, or

R^6 and R^7 represent arylalkyl or aryl, each of which has 6 to 10 carbon atoms in the aryl moiety and 1 to 4 carbon atoms in the straight-chain or branched alkyl moiety where present, and each of which is optionally monosubstituted or polysubstituted in the aryl moiety by identical or different

substituents, the aryl substituents in each case being:

halogen, cyano, nitro, in each case straight-chain or branched alkyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl, each of which has 1 to 6 carbon atoms, in each case straight-chain or branched halogenoalkyl, halogenoalkoxy, halogenoalkylthio, halogenoalkylsulphinyl or halogenoalkylsulphonyl, each of which has 1 to 6 carbon atoms and 1 to 13 identical or different halogen atoms, in each case straight-chain or branched alkoxycarbonyl or alkoximinoalkyl, each of which has 1 to 6 carbon atoms in the individual alkyl moieties, or phenyl which is optionally monosubstitued or polysubstituted by identical or different halogen substituents and/or by straight-chain or branched alkyl or alkoxy, each of which has 1 to 6 carbon atoms, and/or by straight-chain or branched halogenoalkyl or halogenoalkoxy, each of which has 1 to 6 carbon atoms and 1 to 13 identical or different halogen atoms.

3. Substituted triazolinones of the general formula (I) according to claim 1, characterised in that

R^1 represents straight-chain or branched halogenoalkyl having 1 to 4 carbon atoms and 1 to 9 identical or different atoms of fluorine, chlorine or bromine,

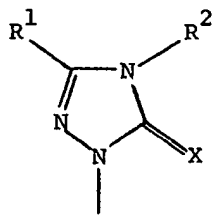
R^2 represents hydrogen, amino, cyano, straight-chain or branched alkyl having 1 to 6 carbon atoms, in each case straight-chain or branched alkenyl or alkinyl, each of which has 2 to 4 carbon atoms, straight-chain or branched halogenoalkyl having 1 to 4 carbon atoms and 1 to 9 identical or different atoms of fluorine, chlorine or bromine, in each case straight-chain or

branched halogenoalkenyl or halogenoalkinyl, each of which has 2 to 4 carbon atoms and 1 to 7 identical or different atoms of fluorine, chlorine or bromine, straight-chain or branched alkoxy-alkyl having 1 to 3 carbon atoms in each of the individual alkyl moieties, straight-chain or branched alkylideneimino having 1 to 6 carbon atoms, or cycloalkyl or cycloalkylalkyl, each of which has 3 to 7 carbon atoms in the cycloalkyl moiety and 1 to 3 carbon atoms in the straight-chain or branched alkyl moiety, and each of which is optionally monosubstituted to tetrasubstituted in the cycloalkyl moiety by identical or different halogen substituents selected from fluorine, chlorine and bromine,

R^3 represents hydrogen, fluorine, chlorine or bromine,

R^4 represents cyano or nitro,

R^5 represents nitro, cyano, fluorine, chlorine, bromine or heterocyclyl-C_1-C_3-alkoxy, the heterocyclyl radical being represented by a four- or six-membered, saturated or unsaturated heterocycle having 1 to 3 identical or different hetero atoms selected from nitrogen, oxygen and sulphur, or a radical of the formula R^6, $-O-R^6$, $-S-R^6$, $-S(O)-R^6$, $-SO_2-R^6$, $-SO_2-O-R^6$, $-O-SO_2-R^6$, $-C(O)-O-R^6$, $-NR^6R^7$, $-SO_2-NR^6R^7$, $-C(O)-NR^6R^7$, $-NH-P(O)(OR^6)(R^7)$ or $-NH-P(O)(OR^6)(OR^7)$ or a radical of the formula



and

X represents oxygen or sulphur, where

R^6 and R^7 independently of one another in each case represent hydrogen or straight-chain or branched alkyl which has 1 to 6 carbon atoms and which is optionally monosubstituted, the substituents being:

cyano, carboxyl, carbamoyl, in each case straight-chain or branched alkoxy, alkoxyalkoxy, alkylthio, alkylsulphinyl, alkylsulphonyl, alkoxycarbonyl, alkoxycarbonylalkyl, N-alkyl-aminocarbonyl, N,N-dialkylaminocarbonyl, trialkylsilyl or alkyl-sulphonylaminocarbonyl, each of which has 1 to 6 carbon atoms in the individual alkyl moieties, or heterocyclyl, the heterocyclyl radical being represented by a five- or six-membered, saturated or unsaturated heterocycle having 1 to 3 identical or different hetero atoms selected from nitrogen, oxygen and sulphur;

R^6 and R^7 furthermore represent straight-chain or branched halogenoalkyl having 1 to 4 carbon atoms and 1 to 9 identical or different atoms of fluorine, chlorine or bromine, and being optionally further substituted by C_{1-2}-alkoxycarbonyl, C_{1-6}-cycloalkylaminocarbonyl or cyano,

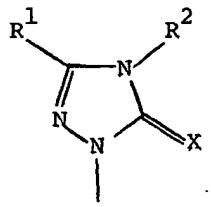
R^6 and R^7 furthermore represent alkenyl or alkinyl, each of which has 2 to 6 carbon atoms and each of which is optionally monosubstitued to trisubstituted by identical or different atoms of fluorine, chlorine or bromine;

R^6 and R^7 furthermore represent cycloalkyl which has 3 to 6 carbon atoms and which is optionally monosubstituted to tetrasubstituted by identical or different atoms of fluorine, chlorine or bromine, and/or by straight-chain or branched alkyl having 1 to 3 carbon atoms, or represent C_{3-6}-cycloalkyl-C_{1-2}-alkyl, or represent phenylalkyl or phenyl, the first-mentioned

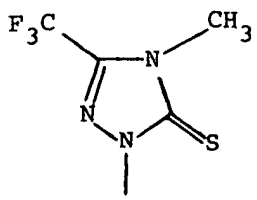
has 1 to 3 carbon atoms in the straight-chain or branched alkyl moiety and each of which is optionally monosubstituted to trisubstituted in the phenyl moiety by identical or different substituents, the phenyl substituents in each case being:

halogen, cyano, nitro, in each case straight-chain or branched alkyl, alkoxy, alkylthio, alkylsulphinyl or alkylsulphonyl, each of which has 1 to 4 carbon atoms, in each case straight-chain or branched halogenoalkyl, halogenoalkoxy, halogenoalkylthio, halogenoalkylsulphinyl or halogenoalkylsulphonyl, each of which has 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, in each case straight-chain or branched alkoxycarbonyl or alkoximinoalkyl, each of which has 1 to 4 carbon atoms in the individual alkyl moieties, or phenyl which is optionally monosubstituted or polysubstituted by identical or different halogen substituents and/or by straight-chain or branched alkyl or alkoxy, each of which has 1 to 4 carbon atoms, and/or by straight-chain or branched halogenoalkyl or halogenoalkoxy, each of which has 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms.

4. A compound according to claim 1, wherein

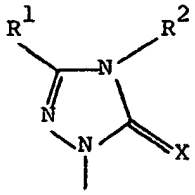


is

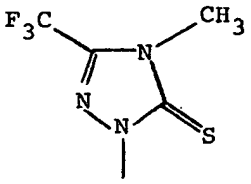


R^3 is F, R^4 is CN and R^5 is H.

5. A compound according to claim 1, wherein

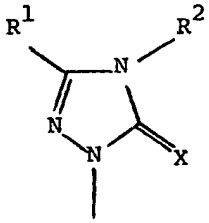


is

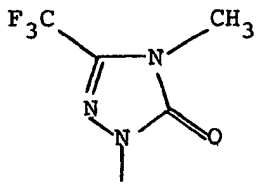


R^3 is F, R^4 is CN and R^5 is F.

6. A compound according to claim 1, wherein

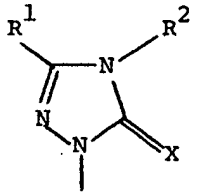


is

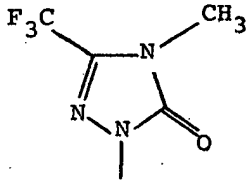


R^3 is F, R^4 is CN and R^5 is CH_3-O-.

7. A compound according to claim 1, wherein

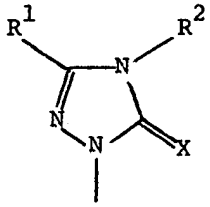


is

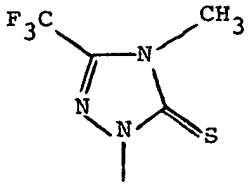


R^3 is H, R^4 is CN and R^5 is F.

8. A compound according to claim 1, wherein

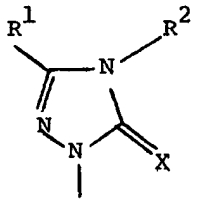


is

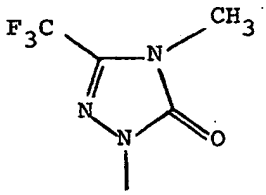


R^3 is F, R^4 is CN and R^5 is CH_3-O-.

9. A compound according to claim 1, wherein

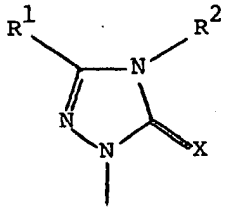


is

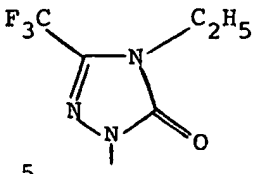


R^3 is F, R^4 is CN and R^5 is C_2H_5-O-.

10. A compound according to claim 1, wherein

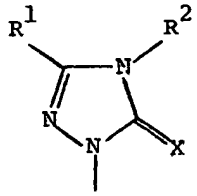


is

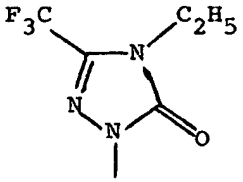


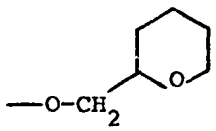
R^3 is H, R^4 is CN and R^5 is F.

11. A compound according to claim 1, wherein

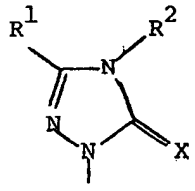


is

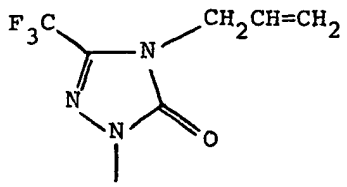


R^3 is F, R^4 is CN and R^5 is  .

12. A compound according to claim 1, wherein



is



R^3 is F, R^4 is CN and R^5 is $-O-\underset{\displaystyle CH_3}{\underset{|}{CH}}-C\equiv CH$

13. A pesticidal or herbicidal composition comprising a pesticidally or herbicidally effective amount of a compound according to any one of claims 1 to 12 in admixture with a suitable carrier or diluent.

14. A pesticidal or herbicidal composition comprising a pesticidally or herbicidally effective amount of a compound according to any one of claims 1 to 12 in admixture with a solid diluent or carrier, a liquified normally gaseous diluent or carrier, or a liquid diluent or carrier containing a surface active agent.

15. A method of combating pests or combating weeds which comprises applying to the pests or weeds, or to a habitat thereof, a pesticidally or herbicidally effective amount of a compound according to any one of claims 1 to 12.

16. A method of combating pests or combating weeds which comprises applying to the pests or weeds, or to a habitat

thereof, a pesticidally or herbicidally effective amount of a composition containing a compound according to any one of claims 1 to 12 in admixture with a suitable carrier or diluent.

17. A method of combating pests or combating weeds which comprises applying to the pests or weeds, or to a habitat thereof, a pesticidally or herbicidally effective amount of a composition containing between 0.0000001 and 95 % by weight of a compound according to any one of claims 1 to 12 in admixture with a suitable carrier or diluent.

18. A method of combating pests or combating weeds which comprises applying to the pests or weeds, or to a habitat thereof, a pesticidally or herbicidally effective amount of a composition containing between 0.0001 and 1 % by weight of a compound according to any one of claims 1 to 12 in admixture with a suitable carrier or diluent.

19. A method of combating weeds which comprises applying to the weeds, or to a habitat thereof, a herbicidally effective amount of a compound according to any one of claims 1 to 12 wherein the compound is applied as a pre-emergence herbicide.

20. A method of combating weeds which comprises applying to the weeds, or to a habitat thereof, a herbicidally effective amount of a compound according to any one of claims 1 to 12 wherein the compound is applied as a post-emergence herbicide.

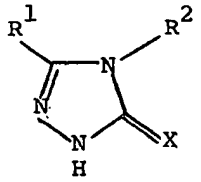
21. A method of combating weeds which comprises applying to the weeds, or to a habitat thereof, a herbicidally effective

amount of a compound according to any one of claims 1 to 12 wherein the compound is applied to an area of cultivation at a rate of between 0.01 and 10 kg/ha.

22. A method of combating weeds which comprises applying to the weeds, or to a habitat thereof, a herbicidally effective amount of a compound according to any one of claims 1 to 12 wherein the compound is applied to an area of cultivation at a rate of between 0.05 and 5 kg/ha.

23. A process for preparing a compound of formula (I) as defined in claim 1, wherein R^1, R^2, R^3, R^4, R^5 and X are as defined in claim 1, which process comprises

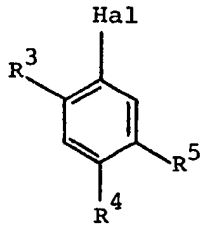
a) reacting a 1H-triazolinone of the formula (II)



(II)

in which

R^1, R^2 and X have the above-mentioned meanings, with a halogenobenzene derivative of the formula (III)



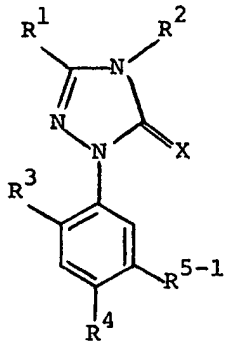
(III)

in which

R^3, R^4 and R^5 have the above-mentioned meanings and

Hal represents halogen, or

b) reacting a substituted triazolinone of the formula (Ia)



(Ia)

in which

R^1, R^2, R^3, R^4 and X have the above-mentioned meanings and

R^{5-1} represents halogen, with a nucleophile of the formula (IV)

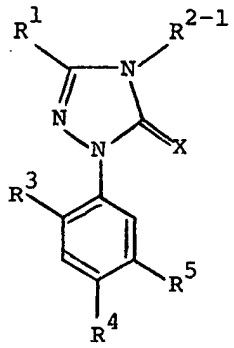
$$R^{6-1}\text{-}Z\text{-}H \qquad \text{(IV)}$$

in which

Z represents oxygen or sulphur and

R^{6-1} represents in each case straight-chain or branched, optionally substituted alkyl, alkenyl, alkinyl, cycloalkyl or aryl, and furthermore, in the event that Z represents oxygen, R^{6-1} also represents heterocyclyl, or

c) reacting a substituted triazolinone of the formula (Ib)



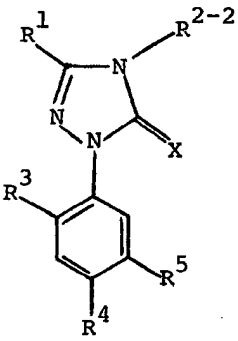
(Ib)

in which

R^1, R^3, R^4, R^5 and X have the above-mentioned meanings and

R^{2-1} represents amino, with sodium nitrite in the presence of an acid or

d) reacting a substituted triazolinone of the formula (Ic)



(Ic)

in which

R^1, R^3, R^4, R^5 and X have the above-mentioned meanings and

R^{2-2} represents hydrogen, with an alkylating agent of the formula (V)

$$R^{2-3}-E \qquad (V)$$

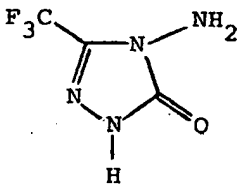
in which

R^{2-3} represents alkyl, alkenyl, alkinyl, halogenoalkyl, halogenoalkenyl, halogenoalkinyl, alkoxyalkyl or optionally substituted cycloalkyl and

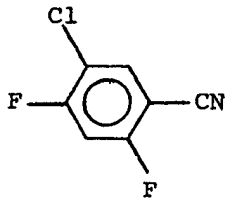
E represents an electron-attracting leaving group.

24. A process for preparing a herbicidal or acaricidal composition comprising admixing a substituted triazolinone of the general formula (I) according to any one of claims 1 to 12 with an extender or surface-active agent.

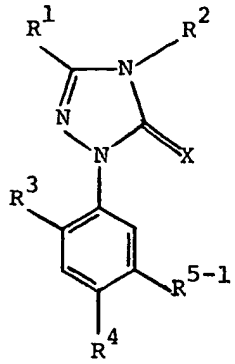
25. 4-Amino-3-trifluoromethyl-1H-1,2,4-triazolin-5-one



26. 2,4-Difluoro-5-chlorobenzonitrile



27. A substituted triazolinone of the general formula (Ia)



(Ia)

characterised in that

R^1 represents halogenoalkyl,

R^2 represents hydrogen, amino, cyano, alkyl, alkenyl, alkinyl, halogenoalkyl, halogenoalkenyl, halogenoalkinyl, alkoxy-alkyl, alkylideneimino or in each case optionally substituted cycloalkyl or cycloalkylalkyl,

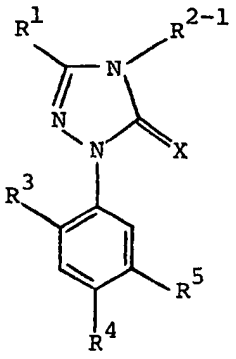
R^3 represents hydrogen or halogen,

R^4 represents cyano or nitro,

X represents oxygen or sulphur and

R^{5-1} represents halogen.

28. A substituted triazolinone of the formula (Ib)



(Ib)

characterised in that

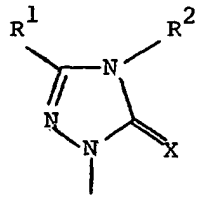
R^1 represents halogenoalkyl,

R^{2-1} represents amino,

R^3 represents hydrogen or halogen,

R^4 represents cyano or nitro,

R^5 represents nitro, cyano, halogen, heterocyclyloxy, a radical of the formula R^6, $-O-R^6$, $-S-R^6$, $-S(O)-R^6$, $-SO_2-R^6$, $-SO_2-O-R^6$, $-O-SO_2-R^6$, $-C(O)-O-R^6$, $-NR^6R^7$, $-SO_2-NR^6R^7$, $-C(O)-NR^6R^7$, $-NH-P(O)(OR^6)(R^7)$ or $-NH-P(O)(OR^6)(OR^7)$ or a radical of the formula

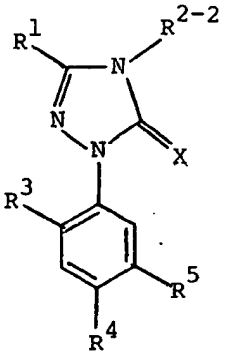


and

X represents oxygen or sulphur, where

R^6 and R^7 independently of one another in each case represent hydrogen or in each case straight-chain or branched, optionally substituted alkyl, alkenyl, alkinyl, cycloalkyl or aryl.

29. A substituted triazolinone of the formula (Ic)



(Ic)

characterised in that

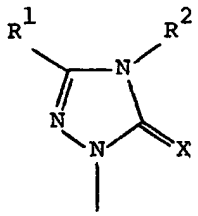
R^1 represents halogenoalkyl,

R^{2-2} represents hydrogen,

R^3 represents hydrogen or halogen,

R^4 represents cyano or nitro,

R^5 represents nitro, cyano, halogen, heterocyclyloxy, a radical of the formula R^6, $-O-R^6$, $-S-R^6$, $-S(O)-R^6$, $-SO_2-R^6$, $-SO_2-O-R^6$, $-O-SO_2-R^6$, $-C(O)-O-R^6$, $-NR^6R^7$, $-SO_2-NR^6R^7$, $-C(O)-NR^6R^7$, $-NH-P(O)(OR^6)(R^7)$ or $-NH-P(O)(OR^6)(OR^7)$ or a radical of the formula



and

X represents oxygen or sulphur, where

R^6 and R^7 independently of one another in each case represent hydrogen or in each case straight-chain or branched, optionally substitued alkyl, alkenyl, alkinyl, cycloalkyl or aryl.